



FCC PART 15.247  
TEST REPORT

For

**DEPO Manufacturing Corp., Ltd.**

1206, BLOCK A Electronic Science & Technology Building,  
2070 Shennan Zhonglu, Shenzhen, P.R. China

**FCC ID: SLA-EBS1002**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Bluetooth mini speaker
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<b>Report Number:</b> RSZ121229801-00	
<b>Report Date:</b> 2013-02-26	
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\* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk "★"

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *DEPO Manufacturing Corp., Ltd.*'s product, model number: *EBS1002 (FCC ID: SLA-EBS1002)* or the "EUT" in this report was a *Bluetooth mini speaker*, which was measured approximately: 5.5 cm (L) x 4.4 cm (W) x 4.0 cm (H), rated input voltage: DC 3.7V from battery.

*Note: The series product, model EBS1002 and EBS1001, they are electrically and mechanically identical and share the same PCB layout and components. The difference between them is only the model number. Model EBS1002 was selected for fully testing, which was explained in the attached product similarity declaration letter.*

*\* All measurement and test data in this report was gathered from production sample serial number: 1229501 (Assigned by BACL, Shenzhen). The EUT was received on 2012-12-29.*

### Objective

This test report is prepared on behalf of *DEPO Manufacturing Corp., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

### Related Submittal(s)/Grant(s)

No related Submittal(s)

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3<sup>rd</sup> Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a testing mode

Test Item	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	CH00_2402 MHz CH39_2441 MHz CH78_2480 MHz	CH00_2402 MHz CH39_2441 MHz CH78_2480 MHz	CH00_2402 MHz CH39_2441 MHz CH78_2480 MHz
Radiated TCs	CH00_2402 MHz CH39_2441 MHz CH78_2480 MHz	Pretest	Pretest
AC Conducted Emission	Charging and Transmitting (CH00 2402MHz)		

Battery we use for all the test was fully charged, except for the FCC Part 15.207 item.

### EUT Exercise Software

Bluetest 3

### Equipment Modifications

No modification was made to the EUT tested.

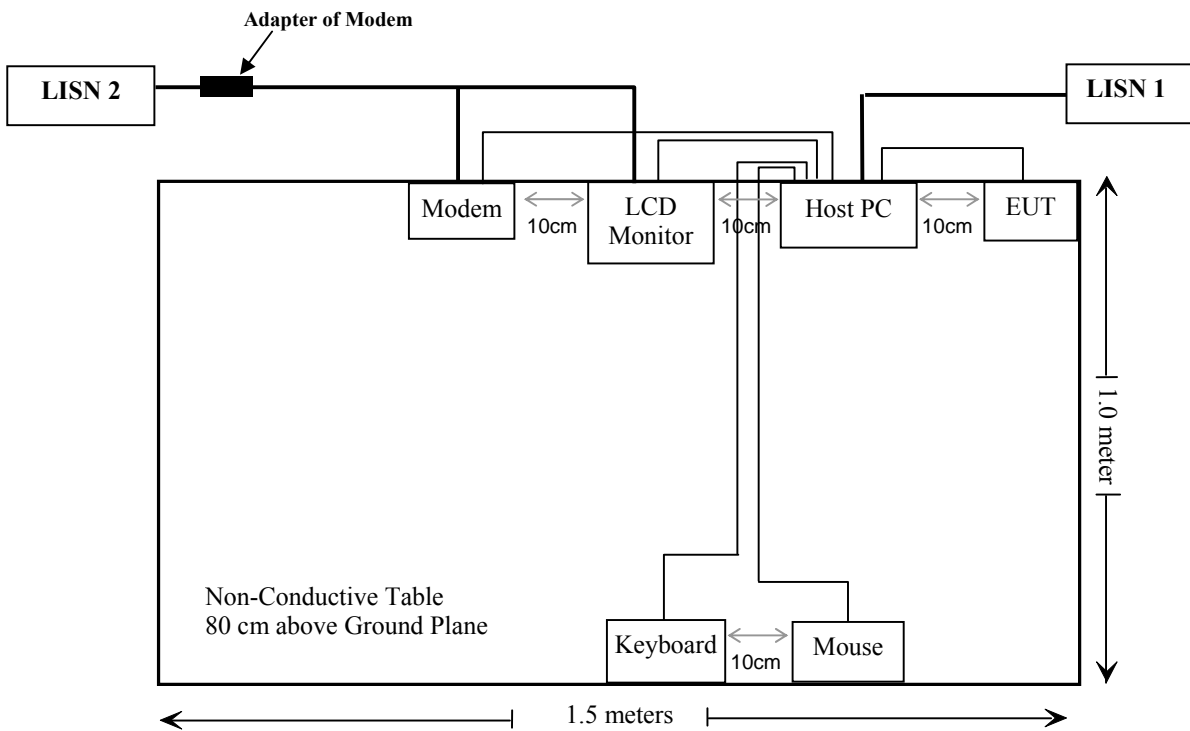
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	PC	127BP2X	2310017721
DELL	Keyboard	L100	CNORH656658907BL04TY
DELL	Mouse	MOC5UO	G1B0096D
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH
SAST	Modem	AEM-2100	0293

**External I/O Cable**

Cable Description	Length (m)	From/Port	To
Shielded Undetachable Mouse Cable	1.5	Host PC	Mouse
Shielded Undetachable K/B Cable	1.5	Host PC	Keyboard
Shielded Detachable VGA Cable	1.5	Host PC	Monitor
Shielded Detachable Modem Cable	1.2	Host PC	Modem
Shielded Detachable USB Cable (for power charging)	1.0	EUT	Host PC
Unshielded Detachable AC Cable	1.0	Host PC	LISN 1
Unshielded Detachable AC Cable	1.5	Monitor	LISN 2
Unshielded Undetachable DC Cable	0.8	Adapter of modem	Modem
Unshielded Detachable DC Cable	0.8	Adapter of modem	LISN 2

**Block Diagram of Test Setup**



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.247 (i),§2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band edges	Compliance



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## **FCC §15.247 (i) & §2.1093 – RF EXPOSURE**

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### **Applicable Standard**

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v05

### **Result**

According to FCC KDB 447498 D01 General RF Exposure Guidance v05 generic portable criteria

The distance between antenna and test point is 5 mm

The Max output power: 3.373 mW

According to the Appendix A of KDB 447498, the exclusion thresholds for 2450 MHz is 10 mW

### **Conclusion:**

The time-averaged output power is 3.373 mW < the exclusion thresholds 10 mW, so stand-alone SAR evaluation is not required.

### **Result: Compliance**

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## **FCC §15.203 – ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### **Antenna Connector Construction**

The EUT used one fixed PCB antenna, which in accordance to section 15.203, the maximum gain is 0 dBi; please refer to the internal photos.

**Result:** Compliance.

## FCC §15.207 (a) - CONDUCTED EMISSIONS

### Applicable Standard

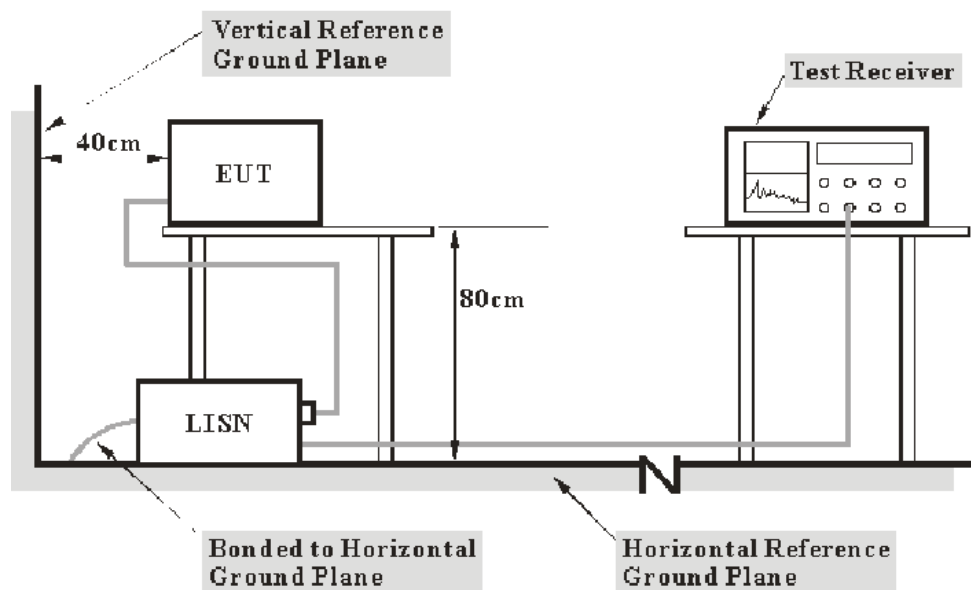
FCC§15.207

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB ( $k=2$ , 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2012-11-24	2013-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2012-08-22	2013-08-21
Rohde & Schwarz	Attenuator	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

## Test Procedure

During the conducted emission test, the host PC was connected to the first LISN and the monitor and modem were connected to the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

**3.36 dB at 13.065 MHz in the Line conductor mode**

## Test Data

### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

*The testing was performed by Dick Zhang on 2013-01-14.*

Test Mode: Charging & Transmitting

AC 120V / 60Hz - Line



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Result (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
13.065	46.64	11.00	50.00	3.36	Ave.
3.520	42.51	10.25	46.00	3.49	Ave.
2.940	40.64	10.23	46.00	5.36	Ave.
1.590	40.22	10.19	46.00	5.78	Ave.
1.735	39.65	10.19	46.00	6.35	Ave.
26.565	42.47	11.87	50.00	7.53	Ave.
26.420	48.63	11.88	60.00	11.37	QP
13.065	48.56	11.00	60.00	11.44	QP
2.940	44.45	10.23	56.00	11.55	QP
3.520	43.80	10.25	56.00	12.20	QP
1.590	41.59	10.19	56.00	14.41	QP
1.735	39.99	10.19	56.00	16.01	QP

**Neutral:**



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Result (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
13.210	46.40	10.97	50.00	3.60	Ave.
26.515	43.72	11.71	50.00	6.28	Ave.
1.545	39.10	10.19	46.00	6.90	Ave.
12.150	42.97	10.81	50.00	7.03	Ave.
13.260	52.80	10.98	60.00	7.20	QP
26.420	52.20	11.73	60.00	7.80	QP
12.150	50.91	10.81	60.00	9.09	QP
2.410	46.49	10.21	56.00	9.51	QP
2.410	35.65	10.21	46.00	10.35	Ave.
22.710	39.39	12.28	50.00	10.61	Ave.
1.545	43.90	10.19	56.00	12.10	QP
22.710	45.38	12.28	60.00	14.62	QP

## FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

### Applicable Standard

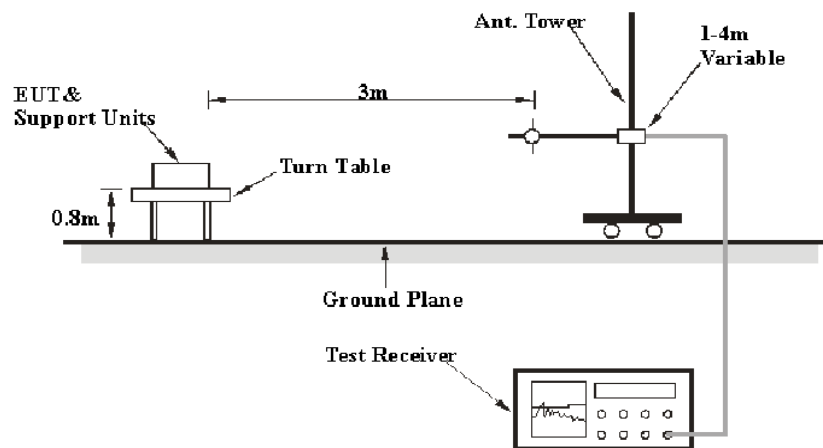
FCC §15.205; §15.209; §15.247(d)

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB. ( $k=2$ , 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

### EUT Setup



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
1000 MHz – 25 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

## Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz -1 GHz and peak and Average detection modes for frequencies above 1 GHz.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini-Circuits	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2012-05-17	2013-05-17
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, with the worst margin reading of:

**7.87 dB at 4882.0 MHz in the Vertical polarization**



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100 kPa

The testing was performed by Dick Zhang on 2012-01-06

Test mode: Transmitting (Scan with GFSK,  $\pi/4$ -DQPSK, 8-DPSK, the worst case is BDR Mode (GFSK))

30 MHz ~25 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part 15.247		
	Reading (dB $\mu$ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dB $\mu$ V/m)	Margin (dB)	Comment
Low Channel (2402 MHz)										
2402.0	85.32	PK	22	1.2	H	6.13	91.45	N/A	N/A	Fund.
2402.0	75.61	Ave.	22	1.2	H	6.13	81.74	N/A	N/A	Fund.
2402.0	84.21	PK	126	1.3	V	6.13	90.34	N/A	N/A	Fund.
2402.0	74.01	Ave.	126	1.3	V	6.13	80.14	N/A	N/A	Fund.
4804.0	33.69	Ave.	32	1.2	V	12.40	46.09	54	7.91	Harmonic
4804.0	47.11	PK	32	1.2	V	12.40	59.51	74	14.49	Harmonic
9608.0	17.26	Ave.	52	1.2	H	19.28	36.54	54	17.46	Harmonic
7206.0	18.52	Ave.	22	1.2	V	17.06	35.58	54	18.42	Harmonic
9608.0	32.87	PK	52	1.2	H	19.28	52.15	74	21.85	Harmonic
7206.0	33.69	PK	22	1.2	V	17.06	50.75	74	23.25	Harmonic
2337.1	22.51	Ave.	12	1.1	H	5.48	27.99	54	26.01	Spurious
2489.5	21.15	Ave.	32	1.3	V	6.81	27.96	54	26.04	Spurious
2367.2	22.47	Ave.	115	1.3	V	5.48	27.95	54	26.05	Spurious
2489.5	34.59	PK	32	1.3	V	6.81	41.40	74	32.60	Spurious
2337.1	35.26	PK	12	1.1	H	5.48	40.74	74	33.26	Spurious
2367.2	35.26	PK	115	1.3	V	5.48	40.74	74	33.26	Spurious
Middle Channel (2441 MHz)										
2441.0	88.81	PK	15	1.2	H	7.21	96.02	N/A	N/A	Fund.
2441.0	78.62	Ave.	15	1.2	H	7.21	85.83	N/A	N/A	Fund.
2441.0	86.93	PK	11	1.0	V	6.81	93.74	N/A	N/A	Fund.
2441.0	76.32	Ave.	11	1.0	V	6.81	83.13	N/A	N/A	Fund.
4882.0	33.67	Ave.	6	1.2	V	12.46	46.13	54	7.87	Harmonic
4882.0	47.61	PK	6	1.2	V	12.46	60.07	74	13.93	Harmonic
9764.0	18.67	Ave.	252	1.2	H	19.40	38.07	54	15.93	Harmonic
7323.0	18.54	Ave.	35	1.1	V	16.49	35.03	54	18.97	Harmonic
9764.0	33.98	PK	252	1.2	H	19.40	53.38	74	20.62	Harmonic
7323.0	33.67	PK	35	1.1	V	16.49	50.16	74	23.84	Harmonic
2489.8	22.81	Ave.	11	1.3	V	6.81	29.62	54	24.38	Spurious
2337.4	22.95	Ave.	5	1.1	H	5.48	28.43	54	25.57	Spurious
2367.5	20.15	Ave.	12	1.3	V	5.48	25.63	54	28.37	Spurious
2489.8	35.69	PK	11	1.3	V	6.81	42.50	74	31.50	Spurious
2337.4	35.26	PK	5	1.1	H	5.48	40.74	74	33.26	Spurious
2367.5	32.54	PK	12	1.3	V	5.48	38.02	74	35.98	Spurious
High Channel (2480 MHz)										
2480.0	90.91	PK	52	1.2	H	7.21	98.12	N/A	N/A	Fund.

2480.0	80.15	Ave.	52	1.2	H	7.21	87.36	N/A	N/A	Fund.
2480.0	88.62	PK	12	1.1	V	6.81	95.43	N/A	N/A	Fund.
2480.0	78.63	Ave.	12	1.1	V	6.81	85.44	N/A	N/A	Fund.
4960.0	32.87	Ave.	12	1.2	V	12.50	45.37	54	8.63	Harmonic
4960.0	46.93	PK	12	1.2	V	12.50	59.43	74	14.57	Harmonic
9920.0	18.52	Ave.	11	1.2	H	19.38	37.90	54	16.10	Harmonic
7440.0	18.67	Ave.	21	1.2	V	15.90	34.57	54	19.43	Harmonic
9920.0	33.67	PK	11	1.2	H	19.38	53.05	74	20.95	Harmonic
7440.0	33.98	PK	21	1.2	V	15.90	49.88	74	24.12	Harmonic
2337.4	22.84	Ave.	63	1.1	H	5.48	28.32	54	25.68	Spurious
2367.2	22.82	Ave.	266	1.3	V	5.48	28.30	54	25.70	Spurious
2489.5	21.19	Ave.	32	1.1	V	6.81	28.00	54	26.00	Spurious
2367.2	35.64	PK	266	1.3	V	5.48	41.12	74	32.88	Spurious
2337.4	35.62	PK	63	1.1	H	5.48	41.10	74	32.90	Spurious
2489.5	34.26	PK	32	1.1	V	6.81	41.07	74	32.93	Spurious

## FCC §15.247(a) (1)-CHANNEL SEPARATION TEST

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

### Test Procedure

1. Set the EUT in transmitting mode, RBW of spectrum was set at 30 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace
3. Measure the channel separation.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100 kPa

\* The testing was performed by Dick Zhang on 2013-01-18.

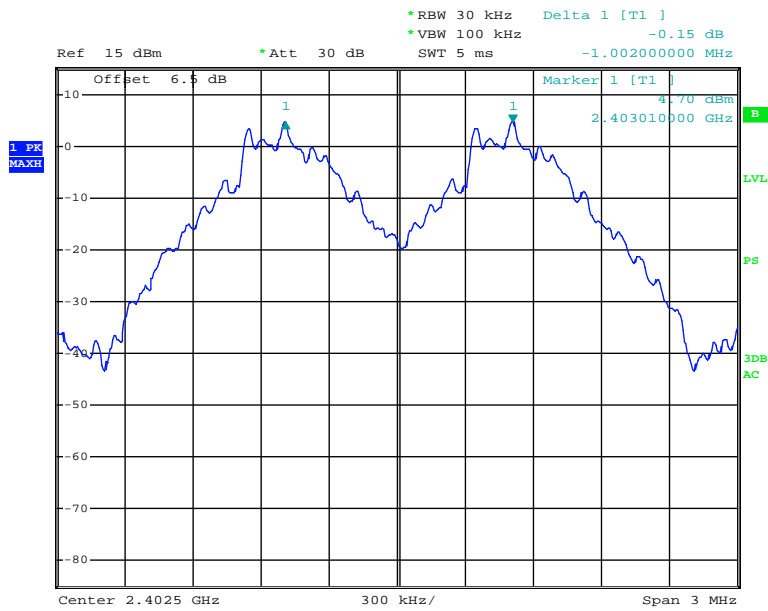
*Test Mode: Transmitting*

*Test Result: Compliance. Please refer to following tables and plots*

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	$\geq$ Limit (MHz)	Result
<b>BDR (GFSK)</b>	Low	2402	1.002	0.605	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.605	Pass
	Adjacent	2442			
	High	2480	1.002	0.605	Pass
	Adjacent	2479			
<b>EDR (<math>\pi/4</math>-DQPSK)</b>	Low	2402	1.002	0.811	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.811	Pass
	Adjacent	2442			
	High	2480	1.002	0.811	Pass
	Adjacent	2479			
<b>EDR (8DPSK)</b>	Low	2402	1.002	0.808	Pass
	Adjacent	2403			
	Middle	2441	1.002	0.808	Pass
	Adjacent	2442			
	High	2480	1.002	0.808	Pass
	Adjacent	2479			

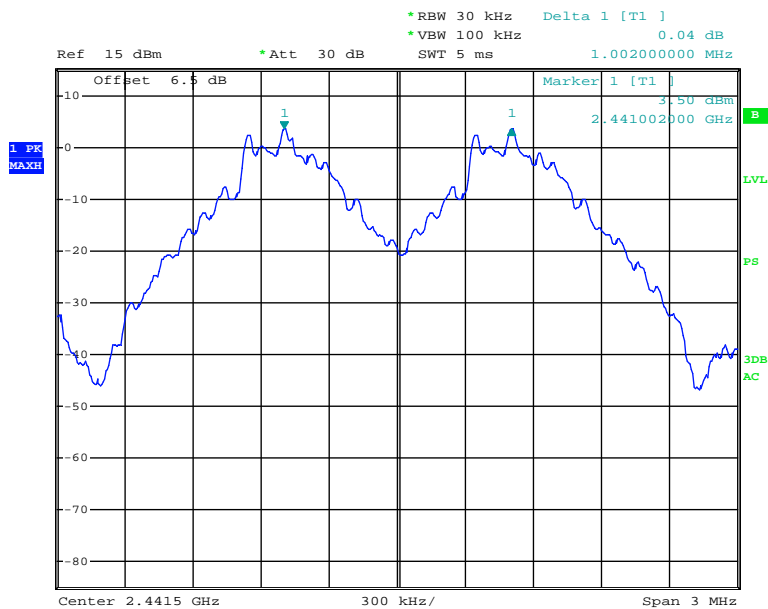
Note: Limit = 20 dB bandwidth\*2/3

### BDR (GFSK): Low Channel



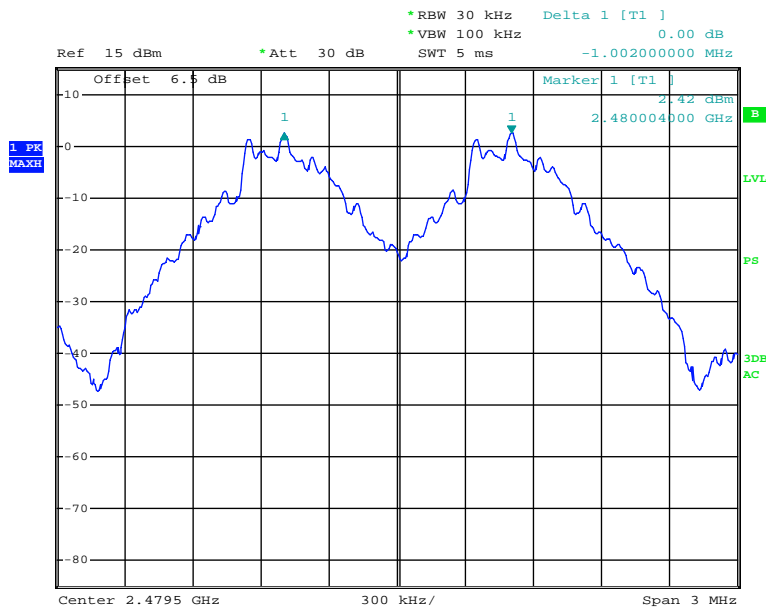
Date: 18.JAN.2013 16:12:52

### BDR (GFSK): Middle Channel



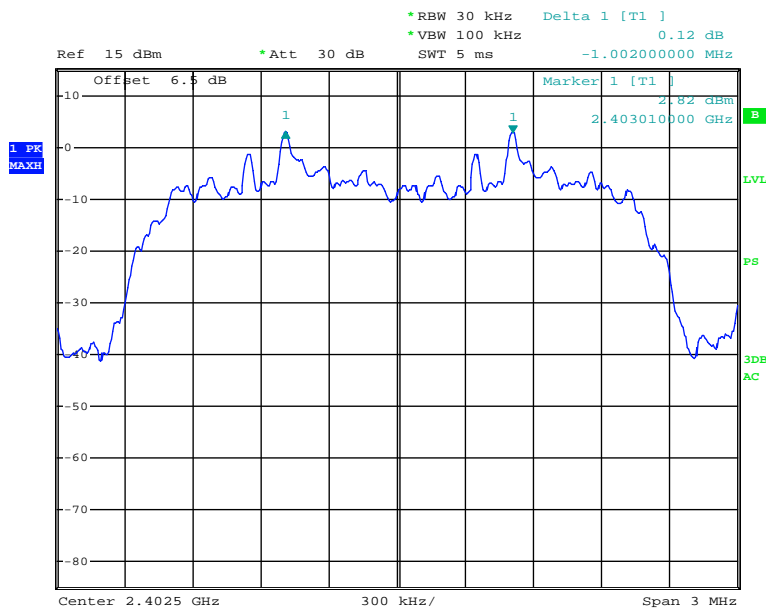
Date: 18.JAN.2013 16:10:34

### BDR (GFSK): High Channel



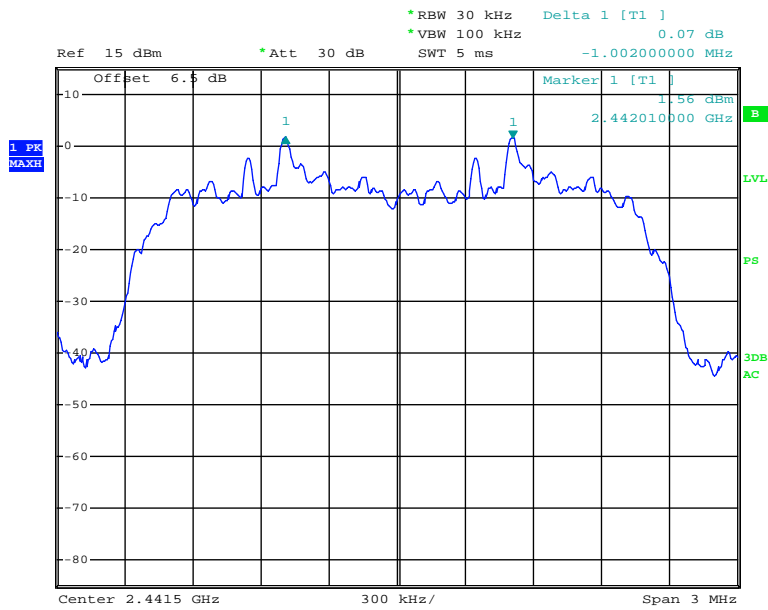
Date: 18.JAN.2013 16:11:51

### EDR ( $\pi/4$ -DQPSK): Low Channel



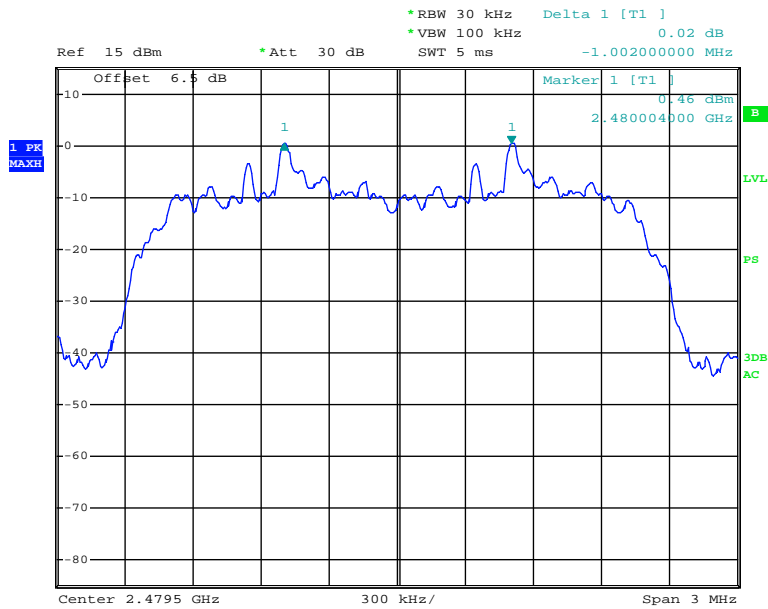
Date: 18.JAN.2013 16:14:17

### EDR ( $\pi/4$ -DQPSK): Middle Channel



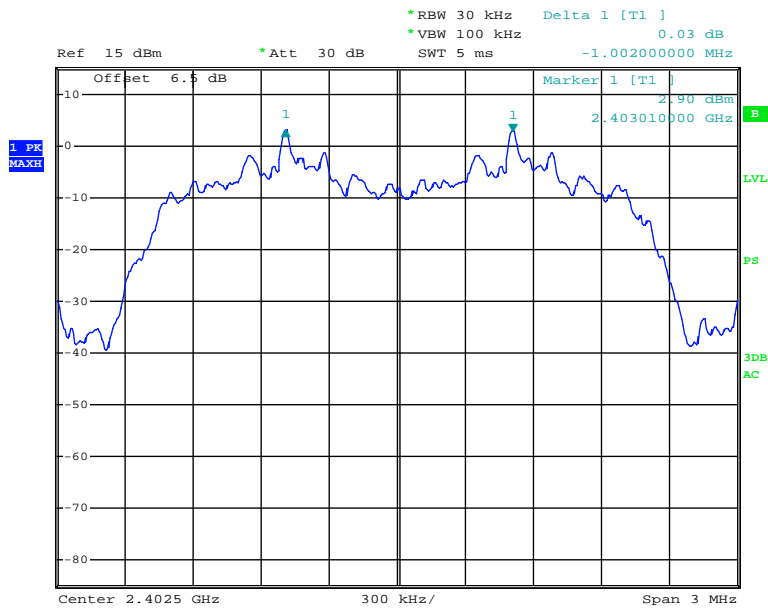
Date: 18.JAN.2013 16:15:13

### EDR ( $\pi/4$ -DQPSK): High Channel



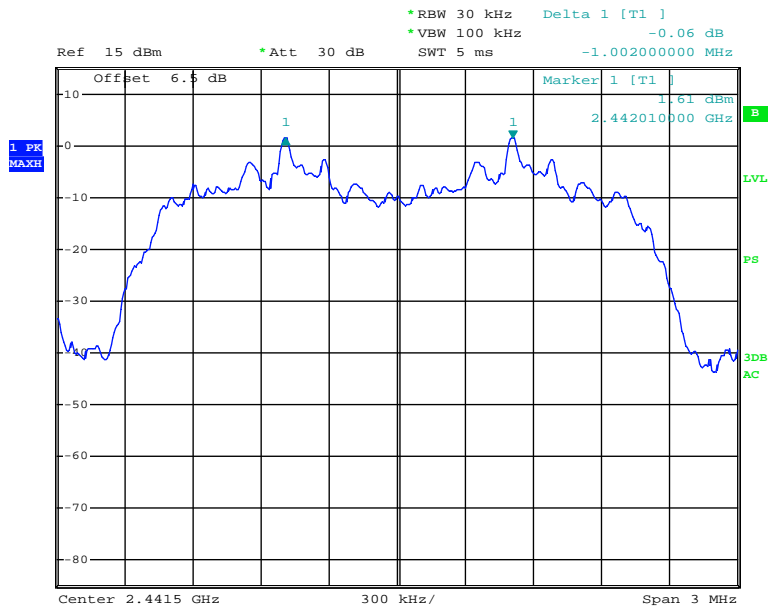
Date: 18.JAN.2013 16:16:46

### EDR (8DPSK): Low Channel



Date: 18.JAN.2013 16:22:35

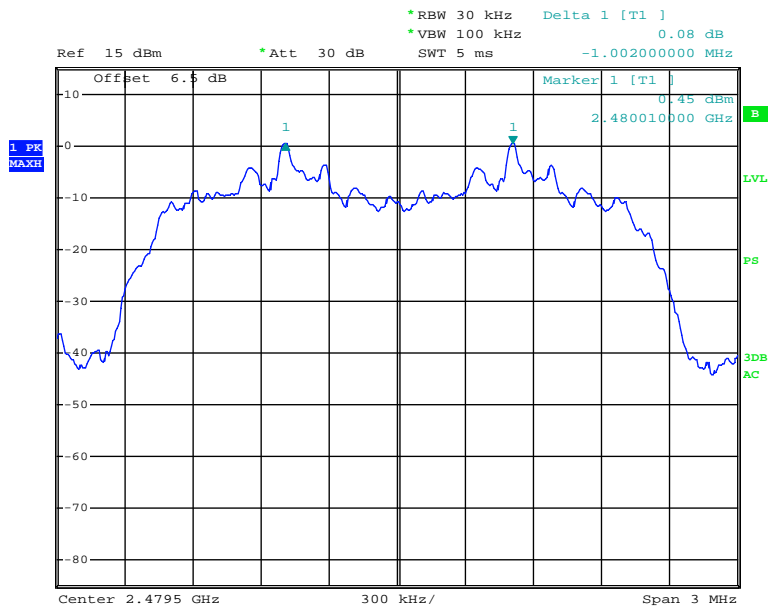
### EDR (8DPSK): Middle Channel



Date: 18.JAN.2013 16:21:38



### EDR (8DPSK): High Channel



Date: 18.JAN.2013 16:20:31

## FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH TESTING

### Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25°C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100 kPa

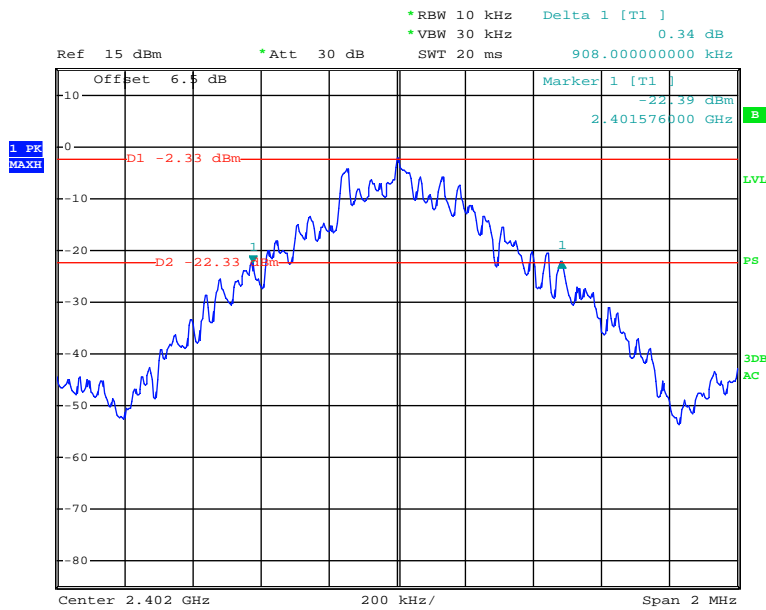
\* The testing was performed by Dick Zhang on 2013-01-18.

*Test Mode: Transmitting*

*Test Result: Compliance. Please refer to following tables and plots*

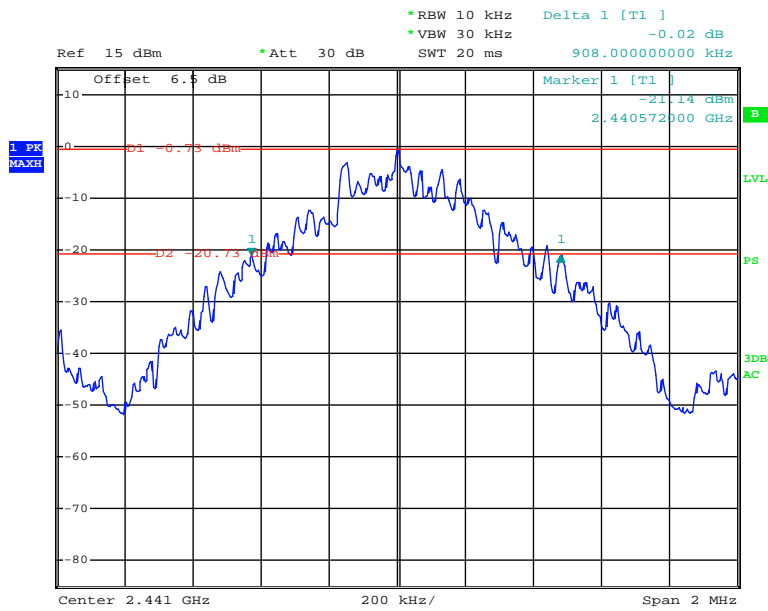
Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
<b>BDR (GFSK)</b>	Low	2402	0.908
	Middle	2441	0.908
	High	2480	0.908
<b>EDR (<math>\pi/4</math>-DQPSK)</b>	Low	2402	1.216
	Middle	2441	1.216
	High	2480	1.216
<b>EDR (8DPSK)</b>	Low	2402	1.212
	Middle	2441	1.212
	High	2480	1.212

**BDR (GFSK): Low Channel**



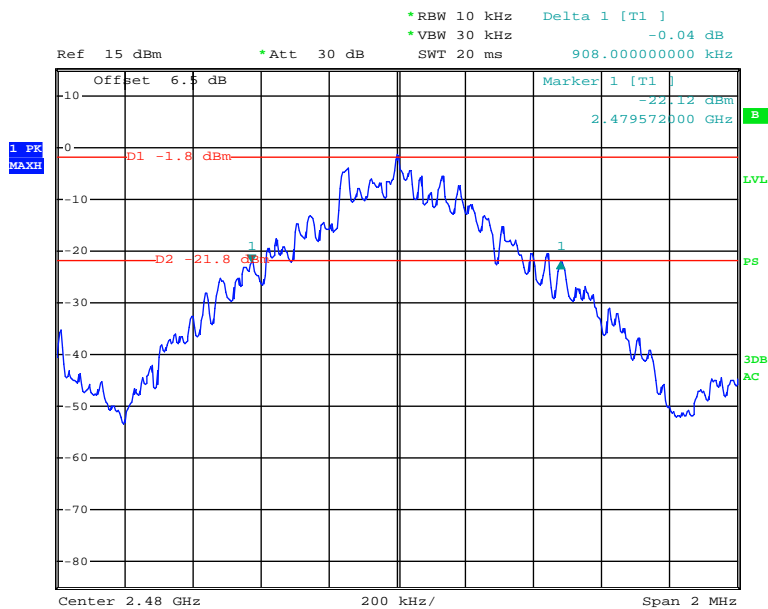
Date: 18.JAN.2013 17:42:38

**BDR (GFSK): Middle Channel**



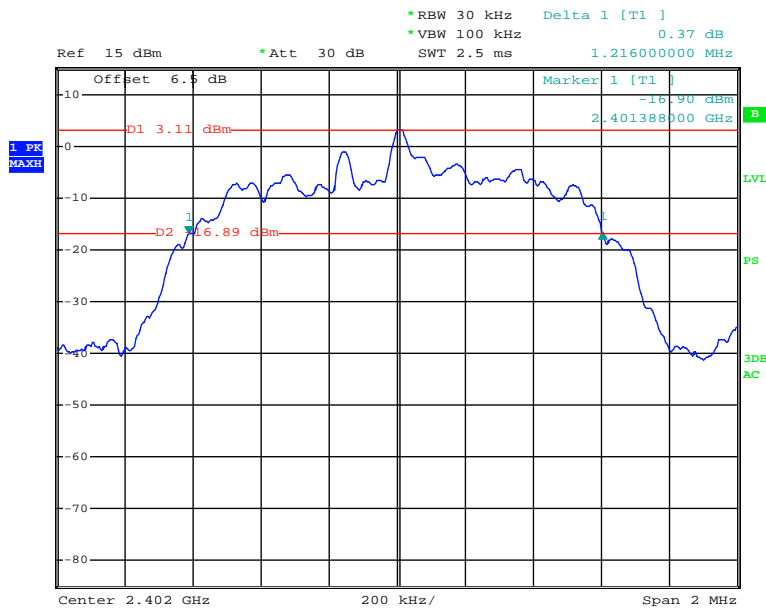
Date: 18.JAN.2013 17:44:51

**BDR (GFSK): High Channel**



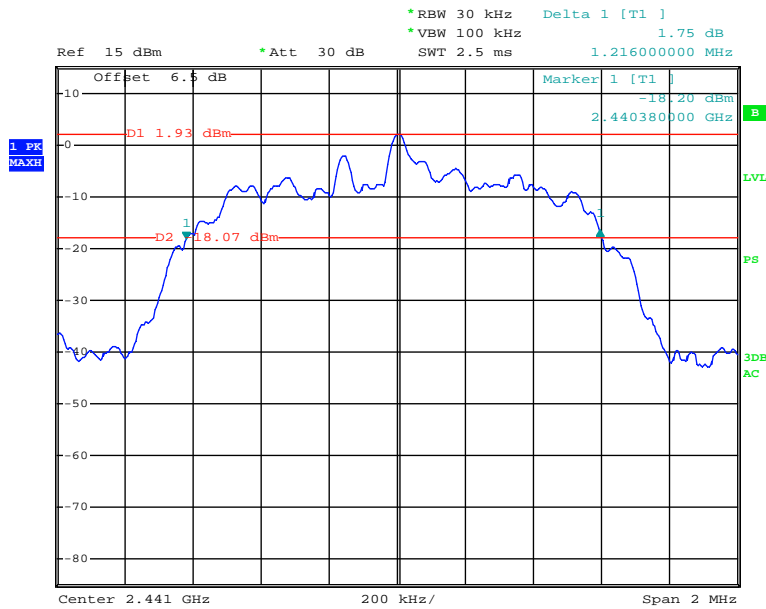
Date: 18.JAN.2013 17:46:34

### EDR ( $\pi/4$ -DQPSK): Low Channel



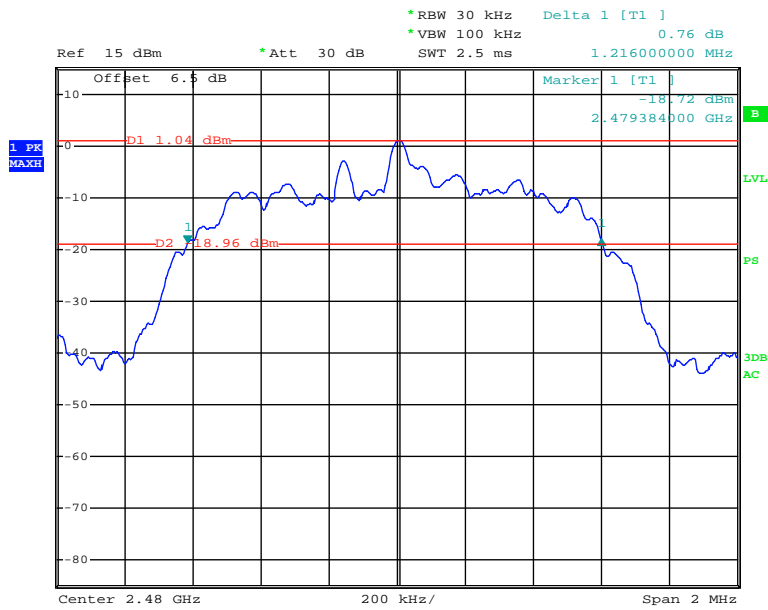
Date: 18.JAN.2013 17:30:14

### EDR ( $\pi/4$ -DQPSK): Middle Channel



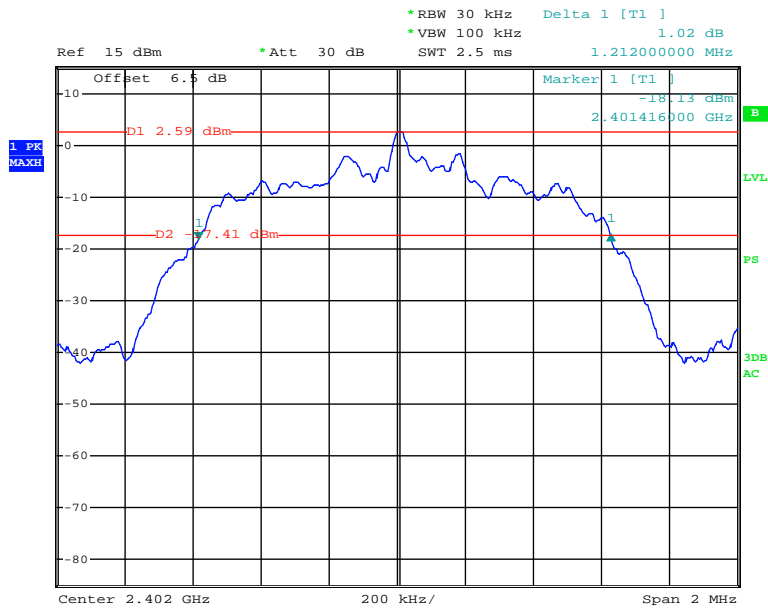
Date: 18.JAN.2013 17:32:02

### EDR ( $\pi/4$ -DQPSK): High Channel



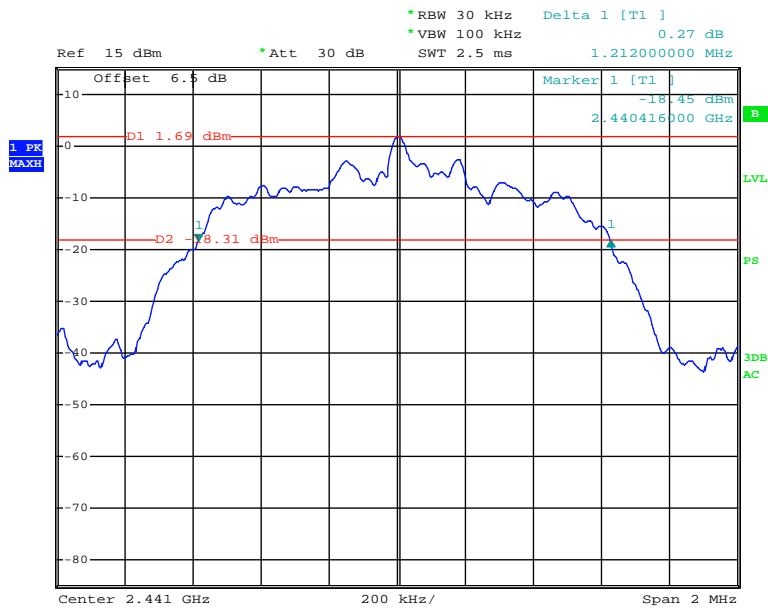
Date: 18.JAN.2013 17:33:35

### EDR (8DPSK): Low Channel



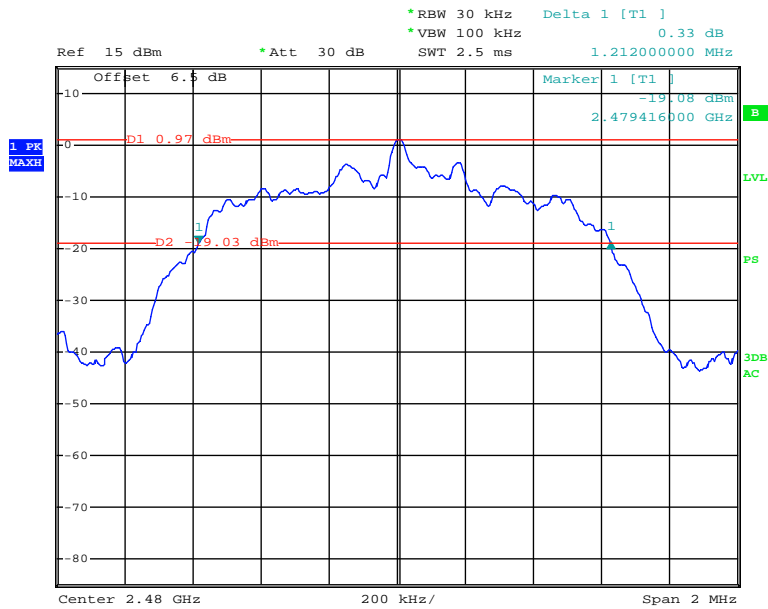
Date: 18.JAN.2013 17:38:58

### EDR (8DPSK): Middle Channel



Date: 18.JAN.2013 17:37:24

### EDR (8DPSK): High Channel



Date: 18.JAN.2013 17:36:08

## **FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST**

### **Applicable Standard**

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### **Test Procedure**

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

### **Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25°C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100 kPa

*The testing was performed by Dick Zhang on 2013-01-18*

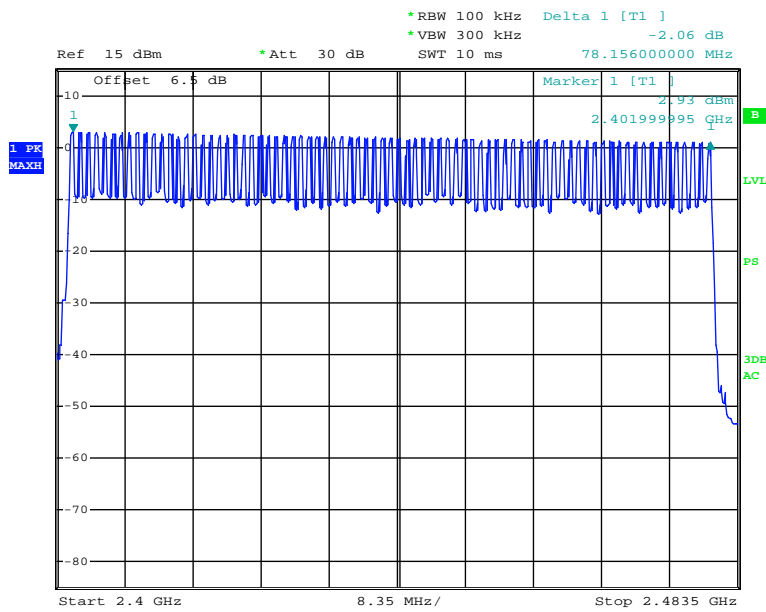
*Test Mode: Transmitting*

*Test Result: Compliance. Please refer to following tables and plots*



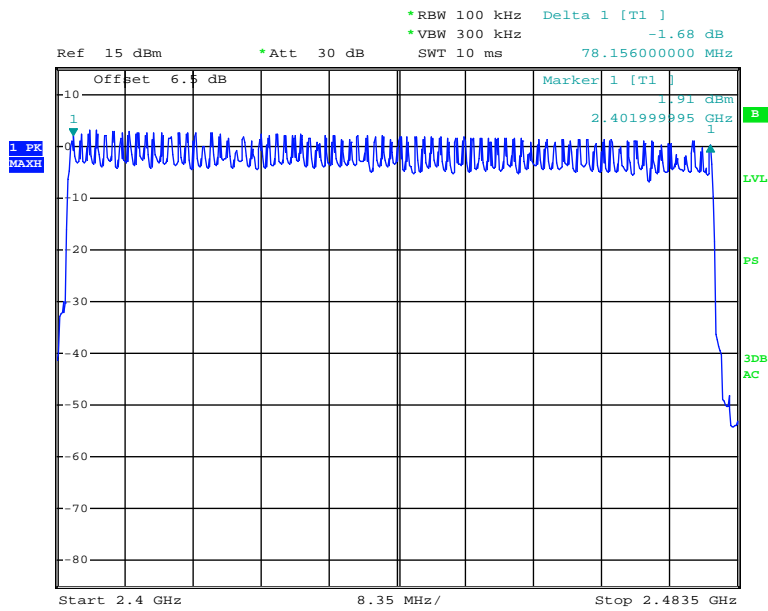
Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR (GFSK)	2400-2483.5	79	≥15
EDR (π/4-DQPSK)	2400-2483.5	79	≥15
EDR (8DPSK)	2400-2483.5	79	≥15

**BDR (GFSK): Number of Hopping Channels**



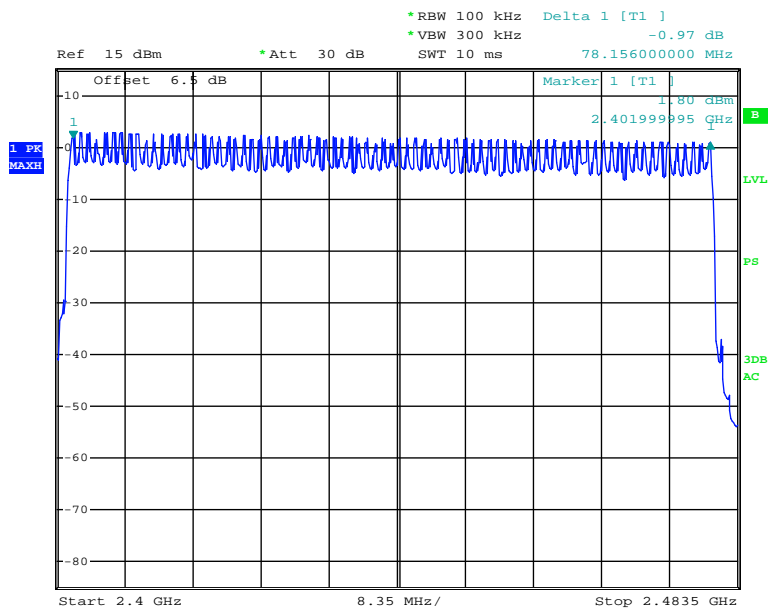
Date: 18.JAN.2013 19:04:31

### EDR ( $\pi/4$ -DQPSK): Number of Hopping Channels



Date: 18.JAN.2013 18:57:48

### (8DPSK): Number of Hopping Channels



Date: 18.JAN.2013 18:54:51

**FCC §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME)**

**Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

**Test Procedure**

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell time = Pulse time\*hope rate/number of hopping channels\*31.6S  
 Hop rate=1600/S

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101 kPa

*The testing was performed by Dick Zhang on 2013-01-17.*

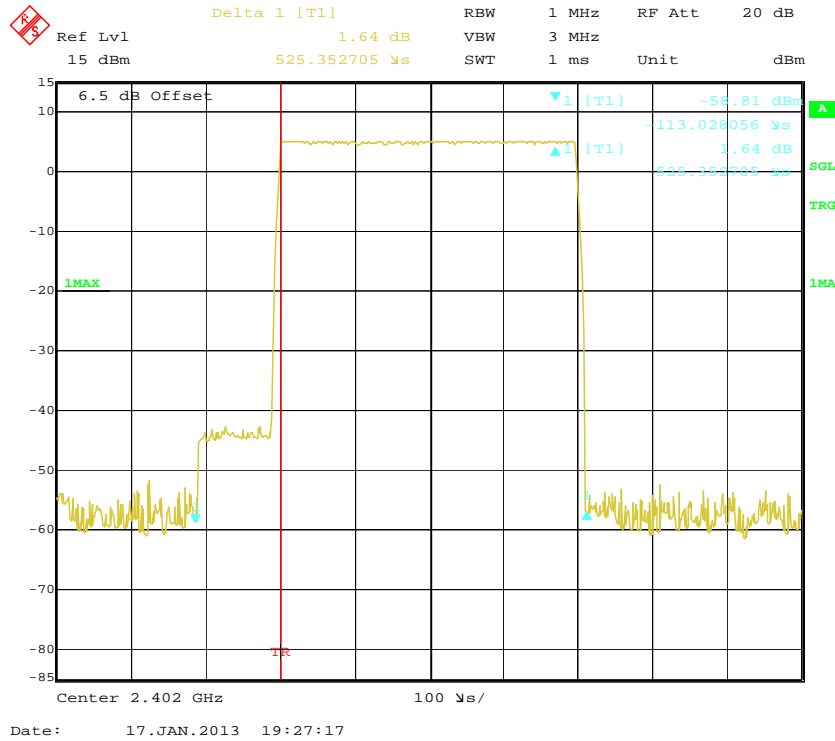
*Test Mode: Transmitting*

*Test Result: Compliance. Please refer to following tables and plots*

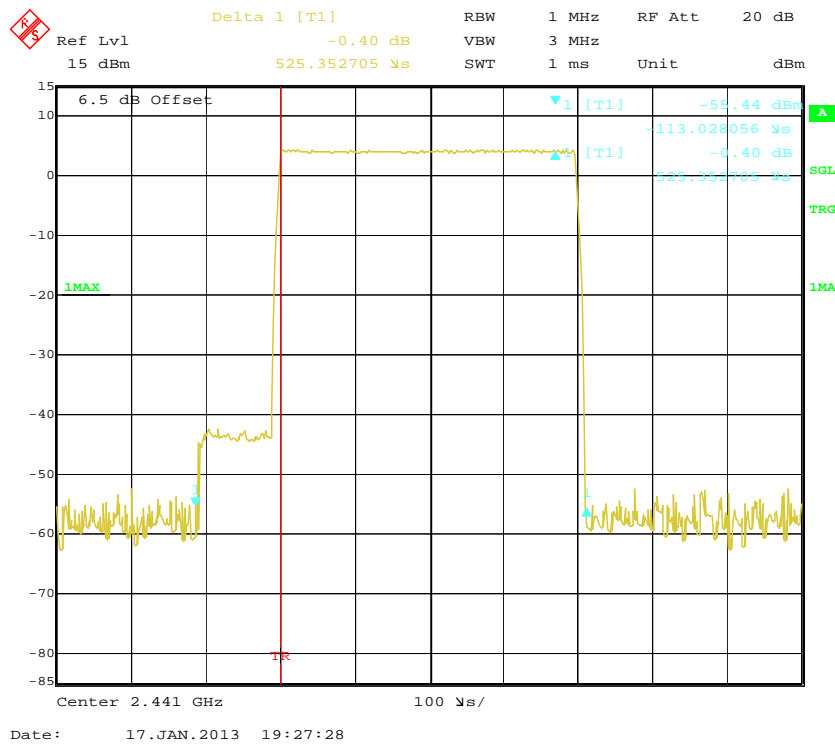
Mode		Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result	
BDR (GFSK)	DH 1	Low	0.525	0.168	0.4	Pass	
		Middle	0.525	0.168	0.4	Pass	
		High	0.525	0.168	0.4	Pass	
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S						
	DH 3	Low	1.800	0.288	0.4	Pass	
		Middle	1.800	0.288	0.4	Pass	
		High	1.800	0.288	0.4	Pass	
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S						
	DH 5	Low	3.074	0.328	0.4	Pass	
		Middle	3.074	0.328	0.4	Pass	
		High	3.074	0.328	0.4	Pass	
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S						
EDR (π/4-DQPSK)	DH 1	Low	0.537	0.172	0.4	Pass	
		Middle	0.537	0.172	0.4	Pass	
		High	0.537	0.172	0.4	Pass	
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S						
	DH 3	Low	1.812	0.290	0.4	Pass	
		Middle	1.812	0.290	0.4	Pass	
		High	1.812	0.290	0.4	Pass	
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S						
	DH 5	Low	3.054	0.326	0.4	Pass	
		Middle	3.054	0.326	0.4	Pass	
		High	3.054	0.326	0.4	Pass	
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S						
EDR (8DPSK)	DH 1	Low	0.537	0.172	0.4	Pass	
		Middle	0.537	0.172	0.4	Pass	
		High	0.537	0.172	0.4	Pass	
	Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S						
	DH 3	Low	1.812	0.290	0.4	Pass	
		Middle	1.812	0.290	0.4	Pass	
		High	1.812	0.290	0.4	Pass	
	Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S						
	DH 5	Low	3.054	0.326	0.4	Pass	
		Middle	3.054	0.326	0.4	Pass	
		High	3.054	0.326	0.4	Pass	
	Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S						

**BDR (GFSK):**

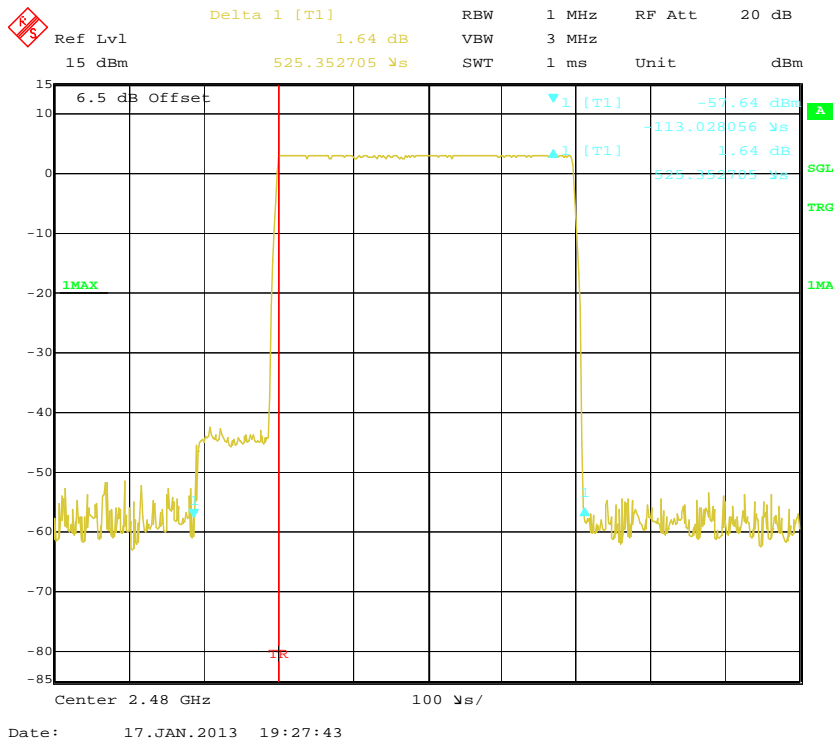
**Pulse time, Low Channel, DH1**



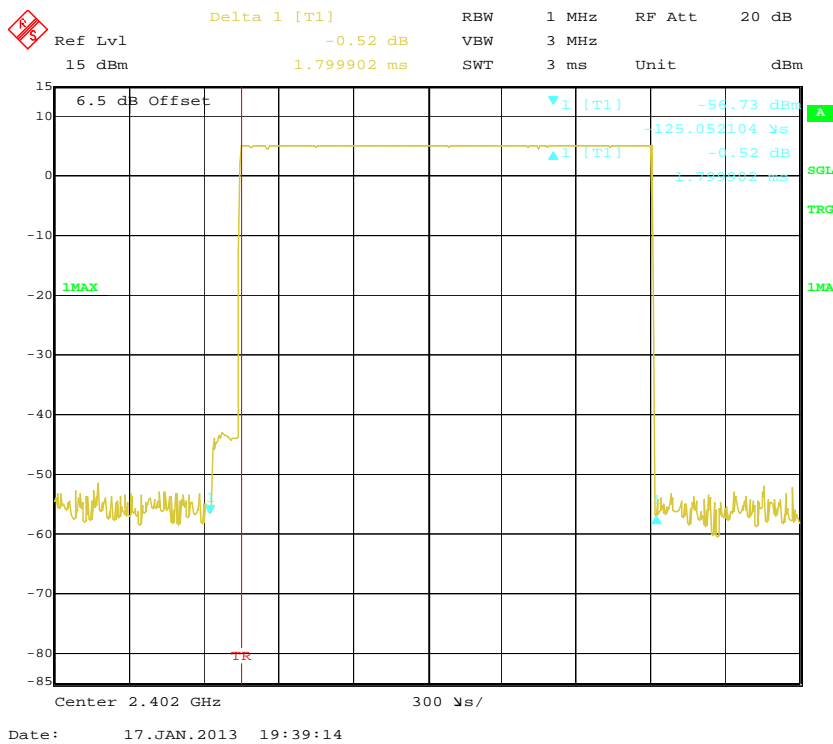
**Pulse time, Middle Channel, DH1**



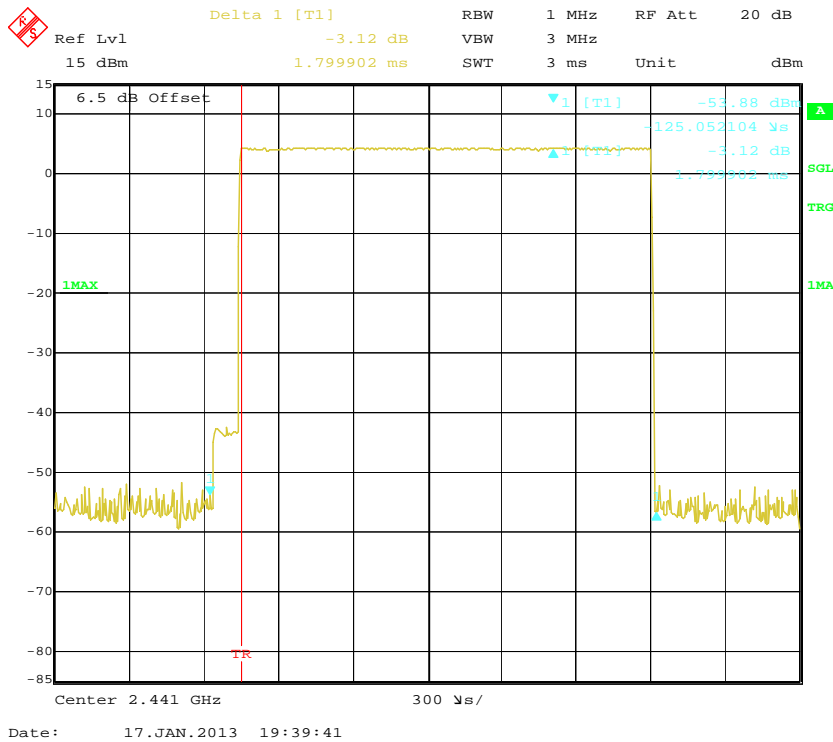
### Pulse time, High Channel, DH1



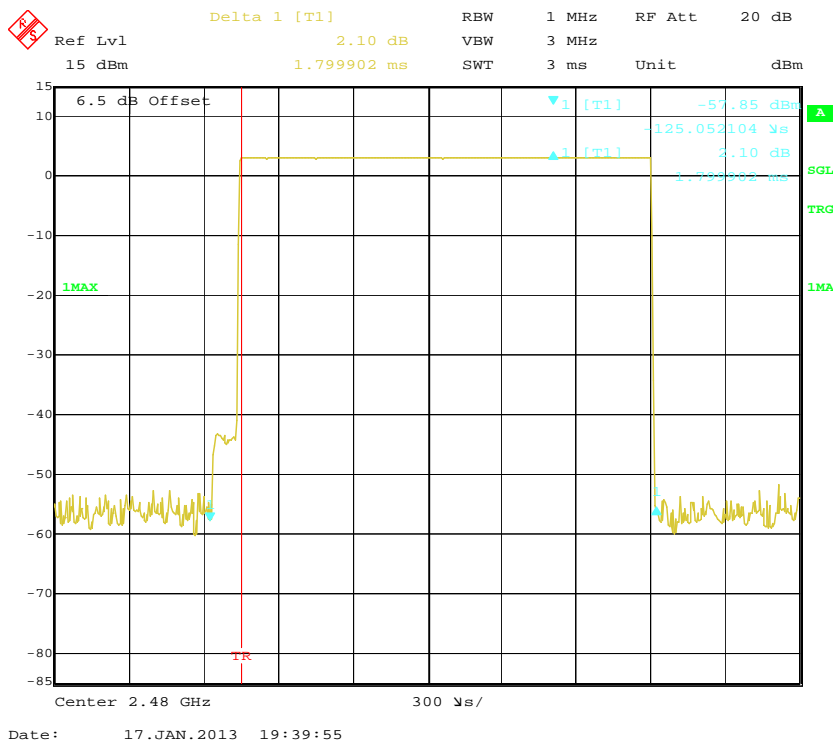
### Pulse time, Low Channel, DH3



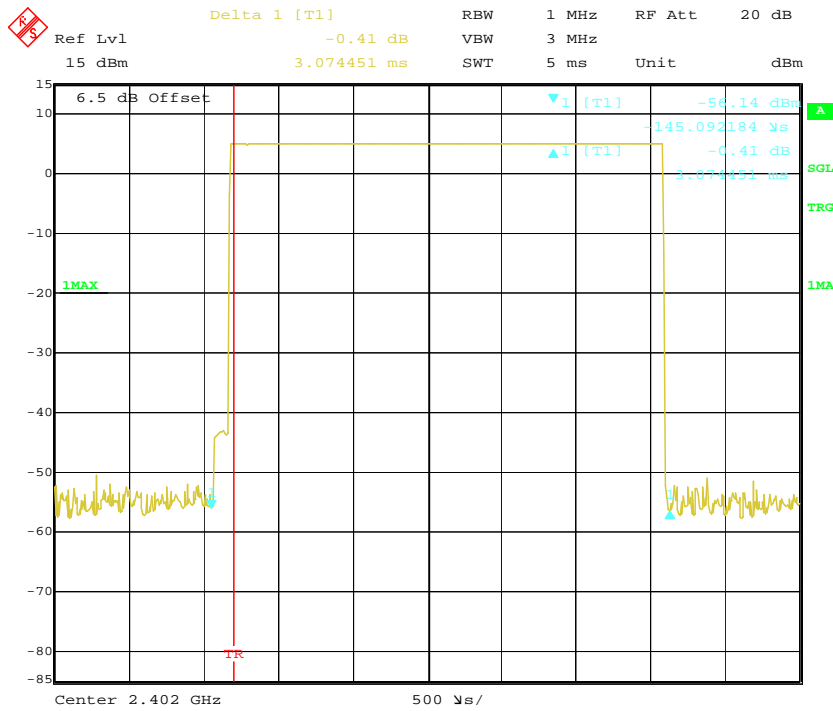
### Pulse time, Middle Channel, DH3



### Pulse time, High Channel, DH3

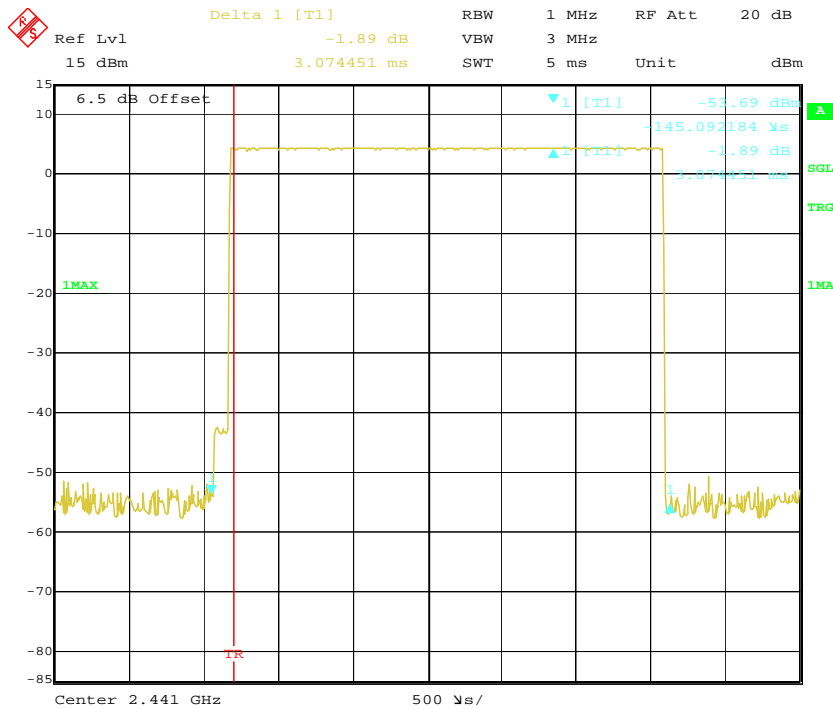


**Pulse time, Low Channel, DH5**



Date: 17.JAN.2013 19:48:04

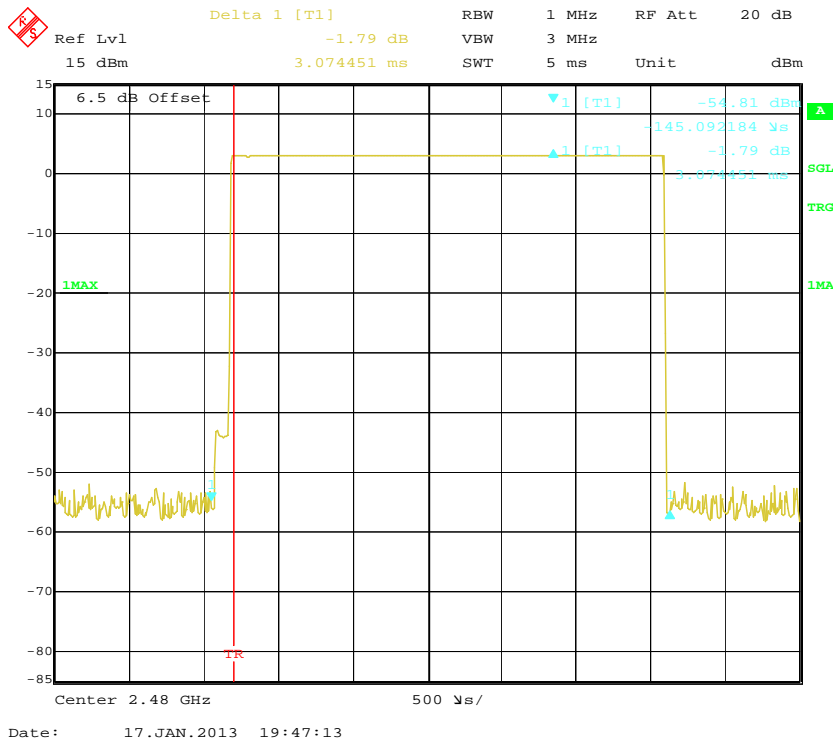
**Pulse time, Middle Channel, DH5**



Date: 17.JAN.2013 19:47:49

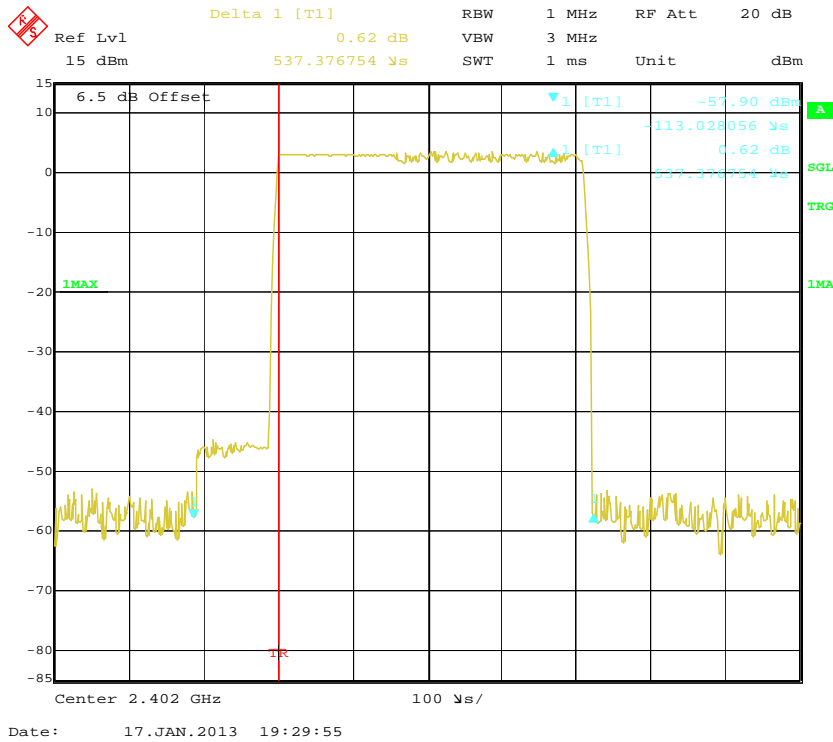


**Pulse time, High Channel, DH5**

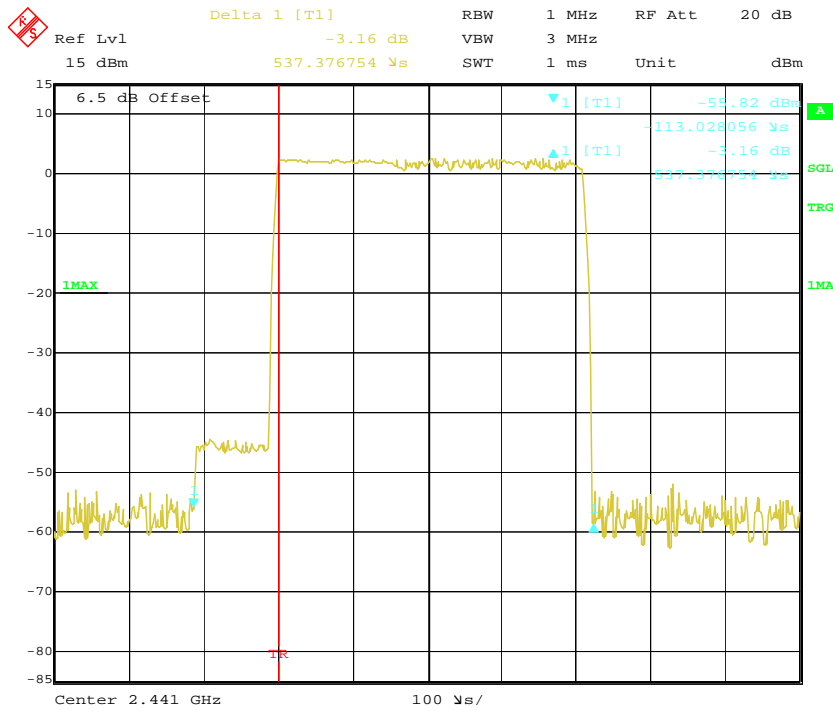


**EDR ( $\pi/4$ -DQPSK):**

**Pulse time, Low Channel, DH1**

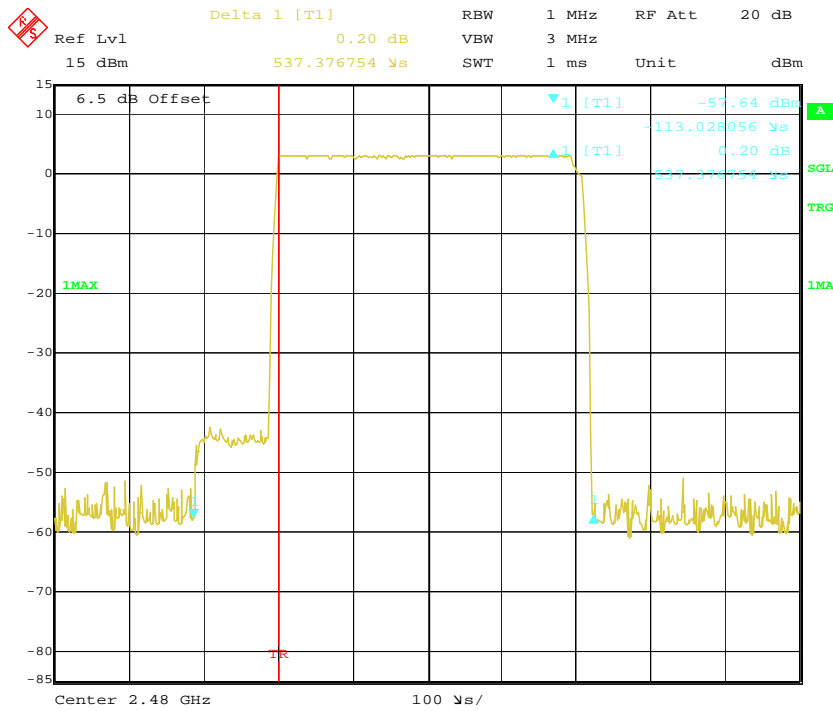


### Pulse time, Middle Channel, DH1



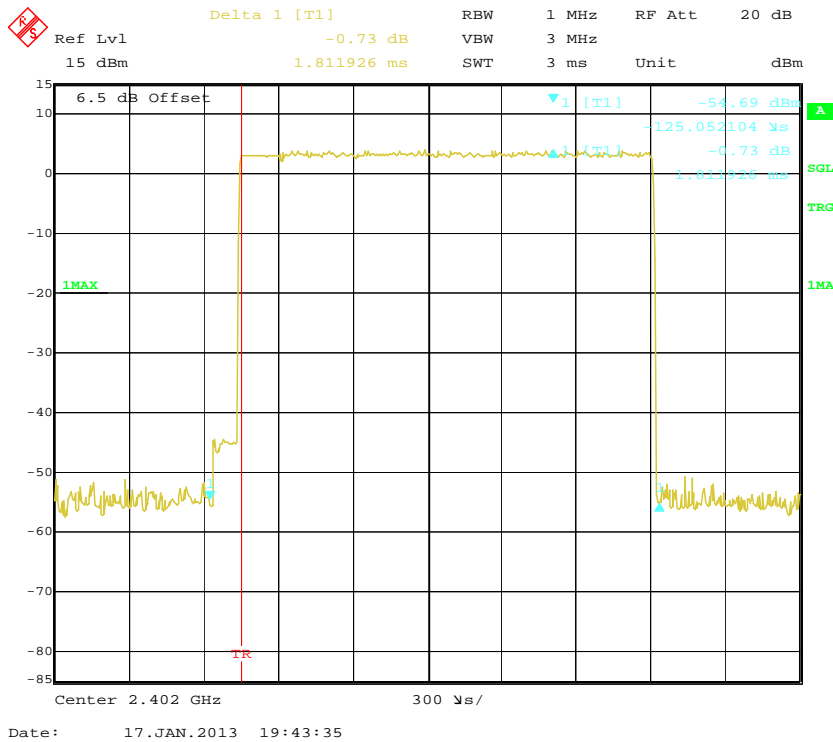
Date: 17.JAN.2013 19:29:37

### Pulse time, High Channel, DH1

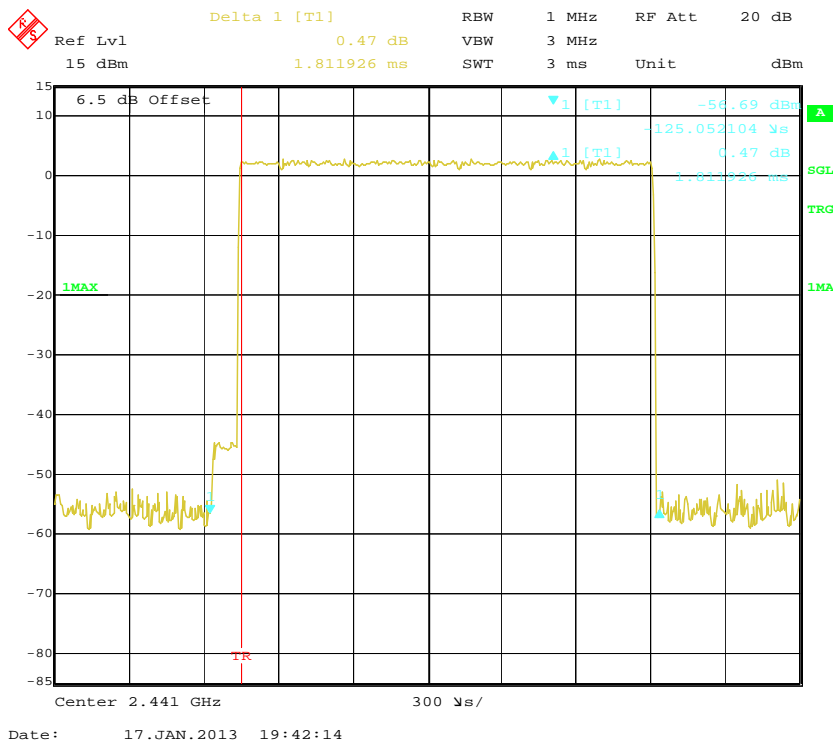


Date: 17.JAN.2013 19:29:13

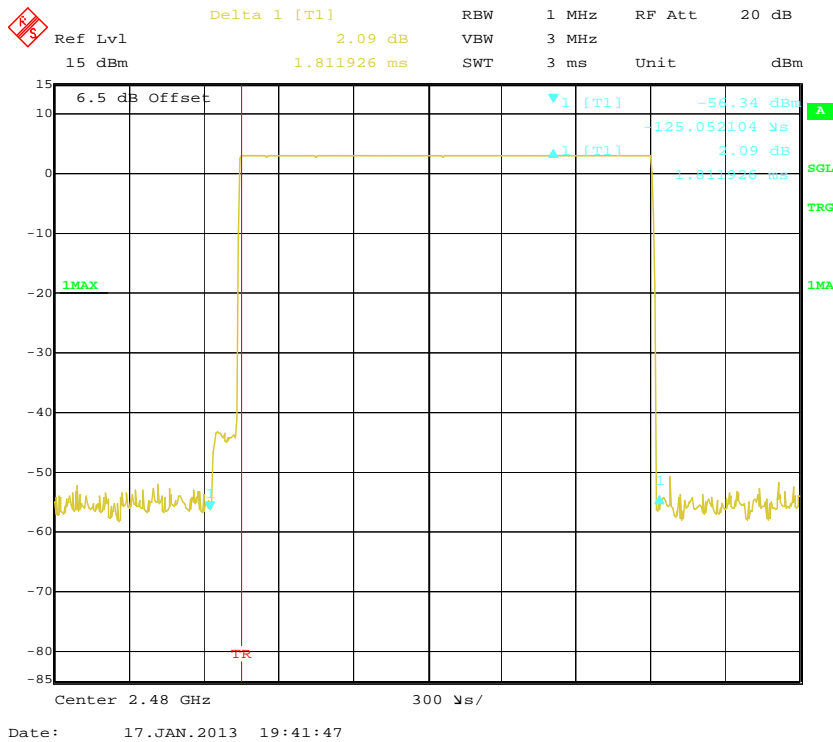
### Pulse time, Low Channel, DH3



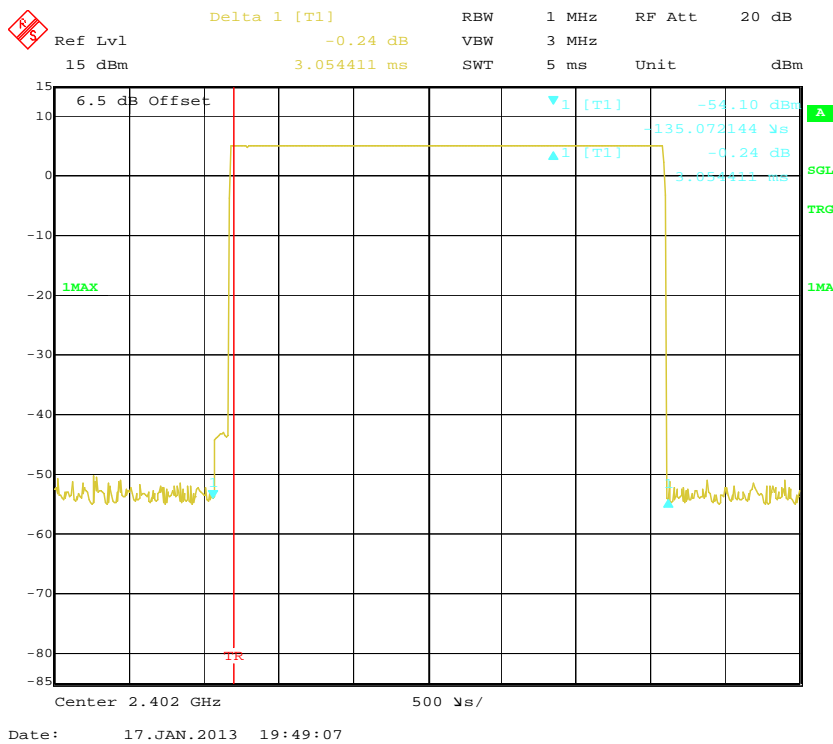
### Pulse time, Middle Channel, DH3



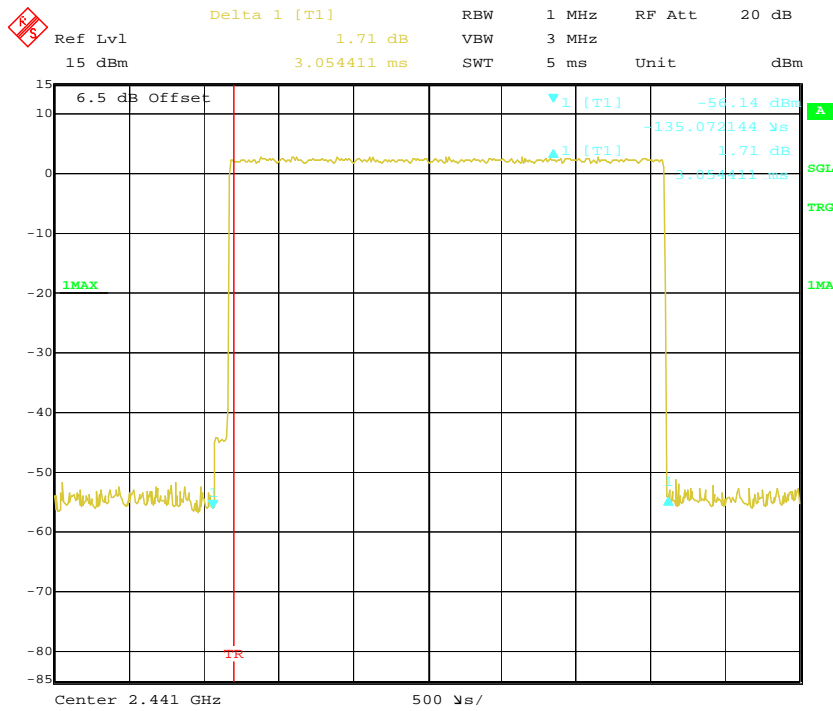
### Pulse time, High Channel, DH3



### Pulse time, Low Channel, DH5

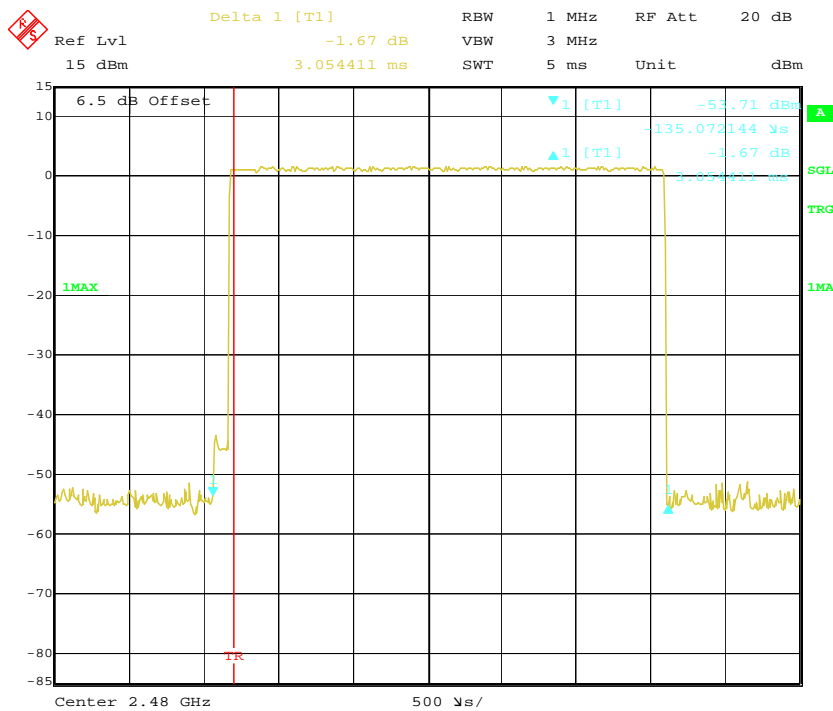


**Pulse time, Middle Channel, DH5**



Date: 17.JAN.2013 19:49:37

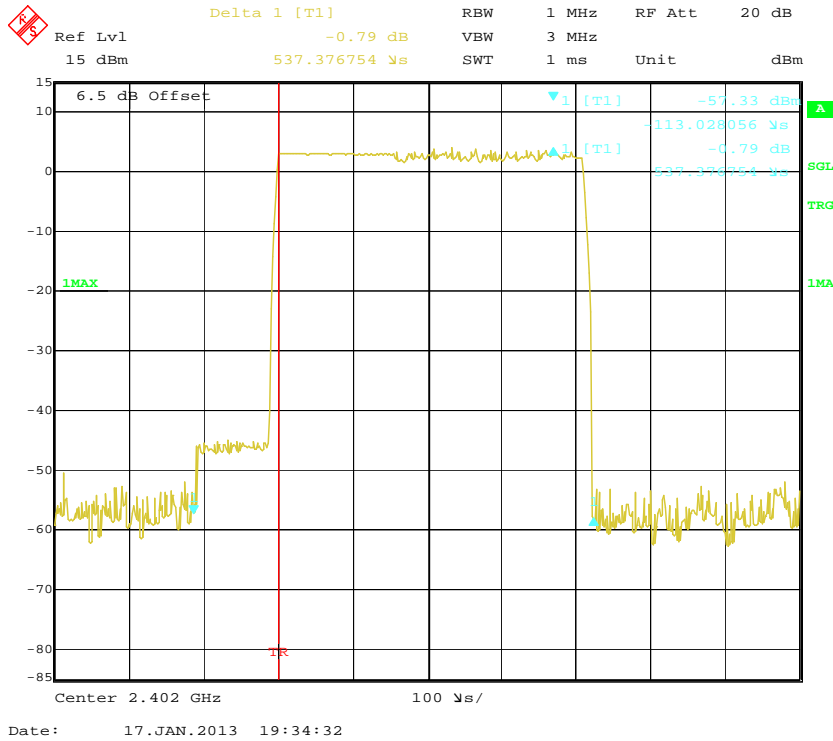
**Pulse time, High Channel, DH5**



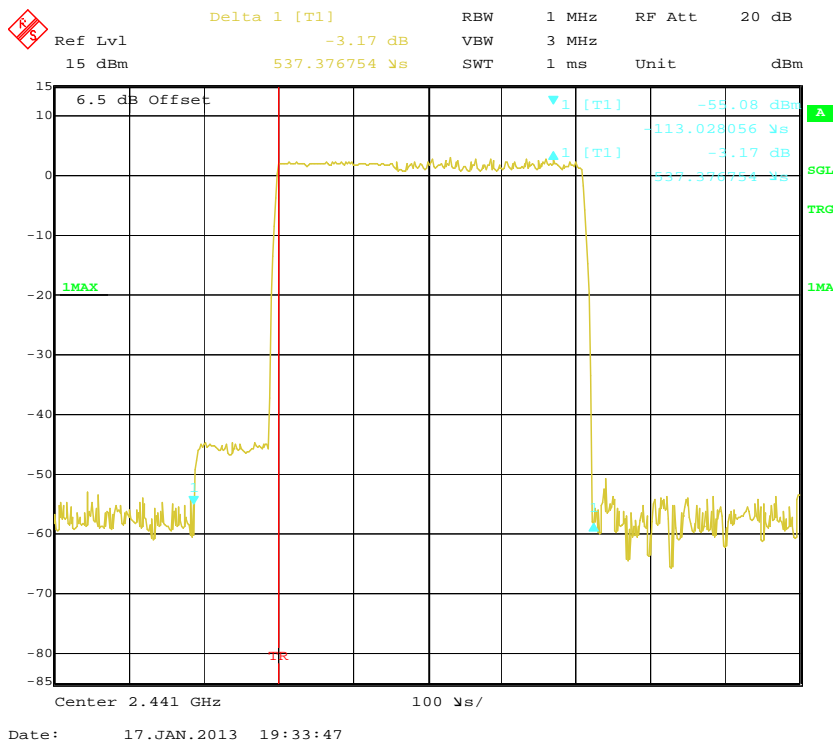
Date: 17.JAN.2013 19:50:13

**EDR (8DPSK):**

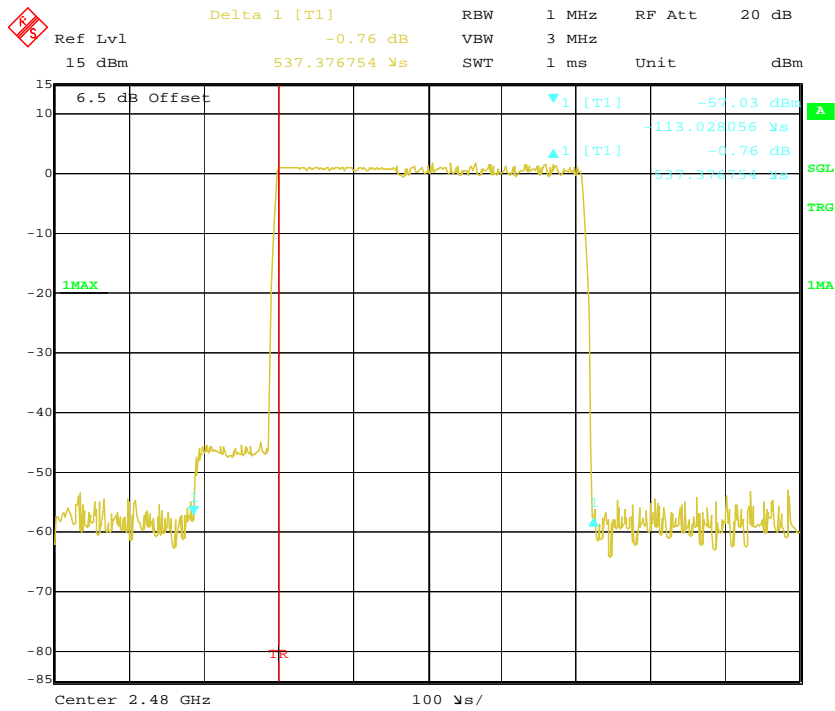
**Pulse time, Low Channel, DH1**



**Pulse time, Middle Channel, DH1**

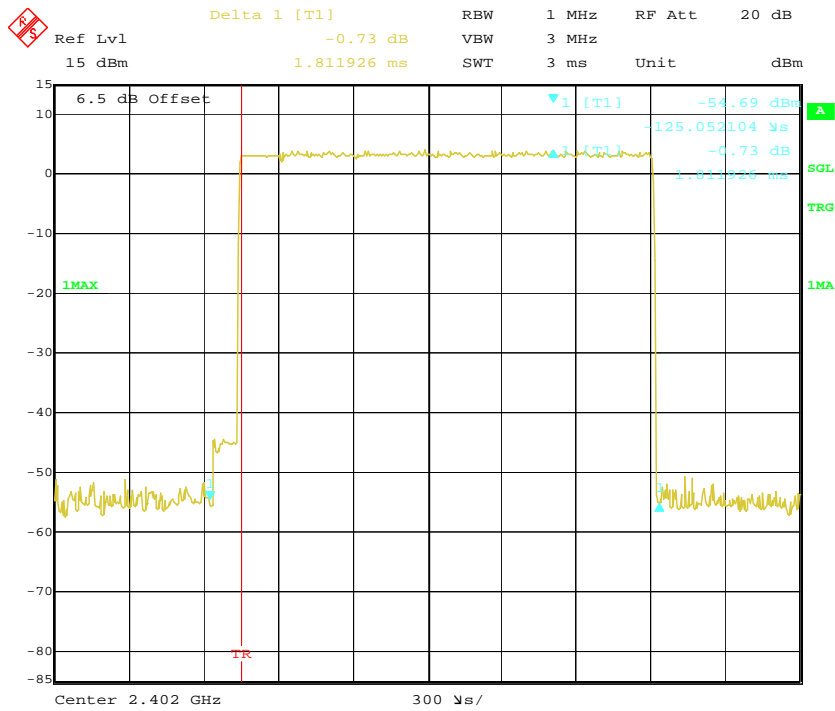


### Pulse time, High Channel, DH1



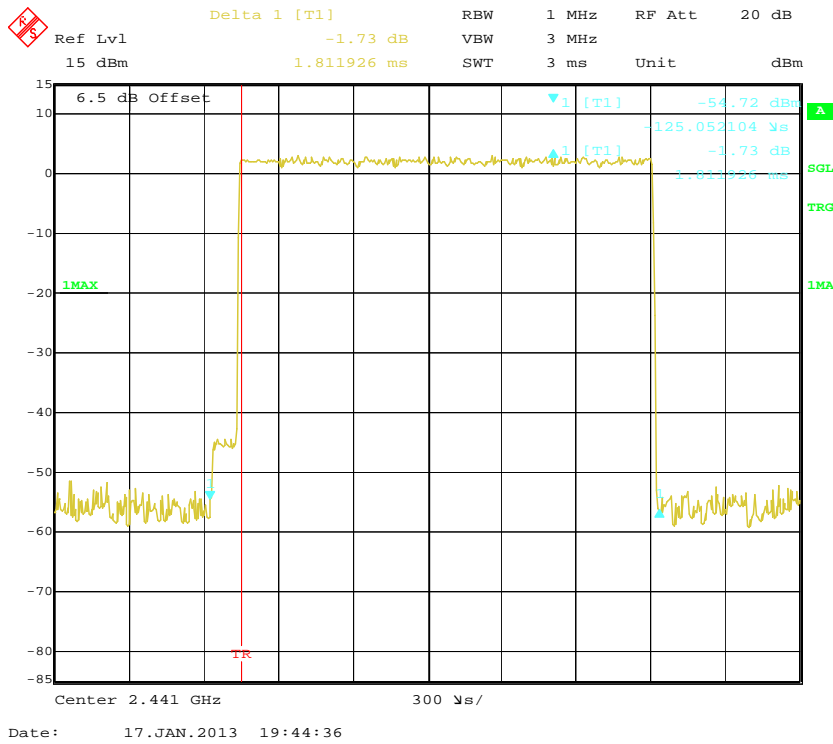
Date: 17.JAN.2013 19:33:31

### Pulse time, Low Channel, DH3

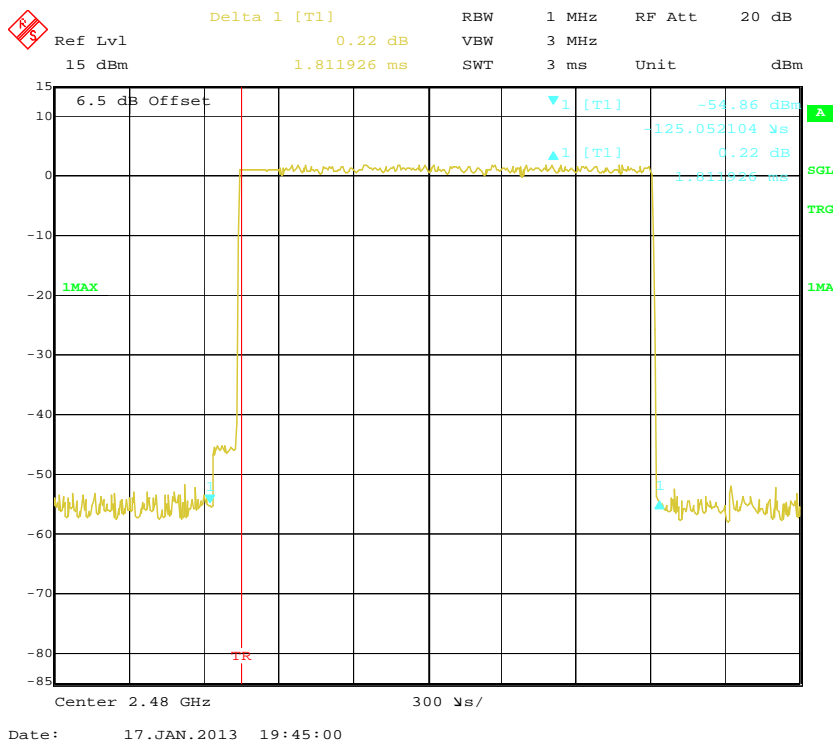


Date: 17.JAN.2013 19:44:01

**Pulse time, Middle Channel, DH3**

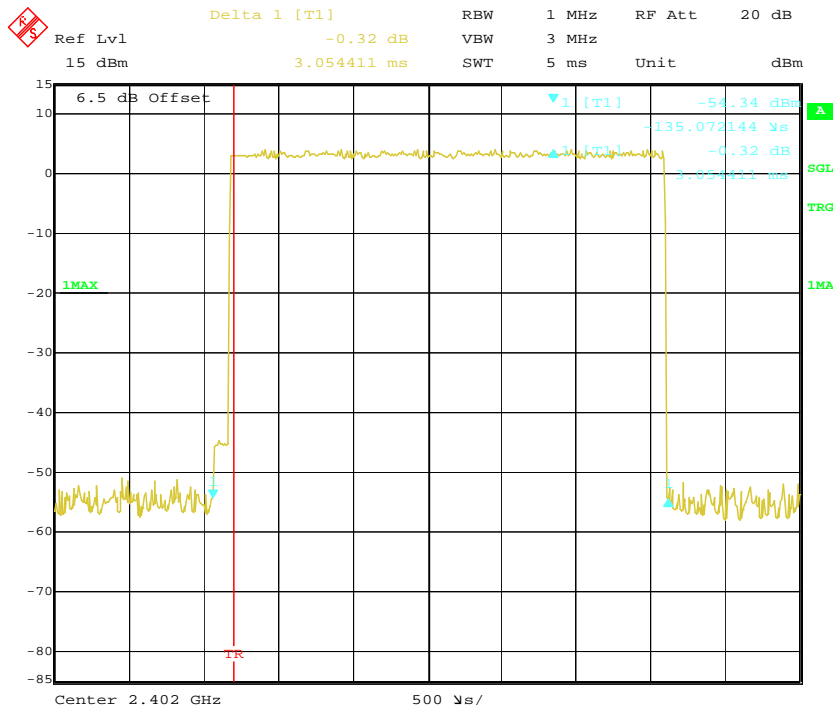


**Pulse time, High Channel, DH3**



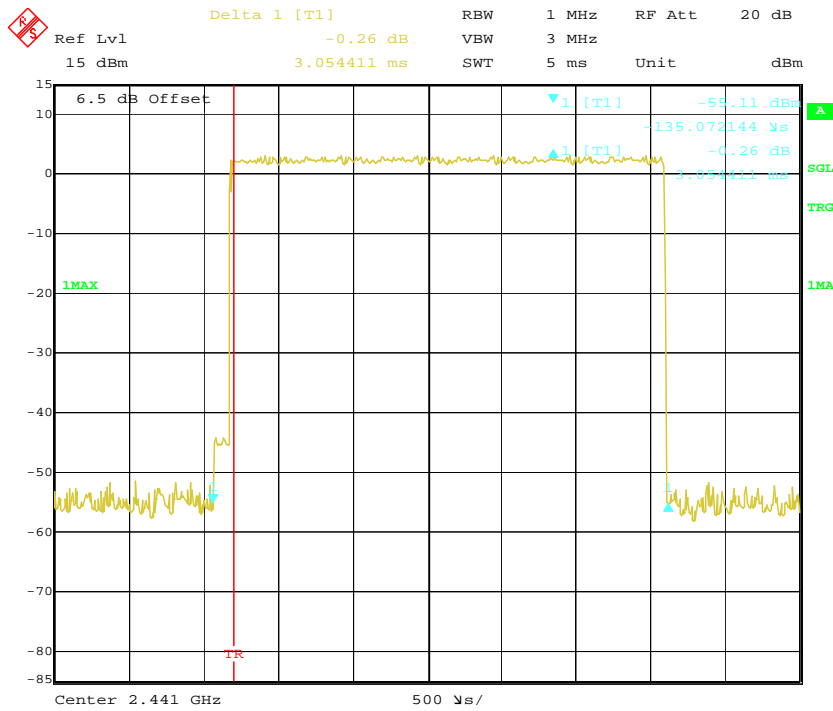


**Pulse time, Low Channel, DH5**



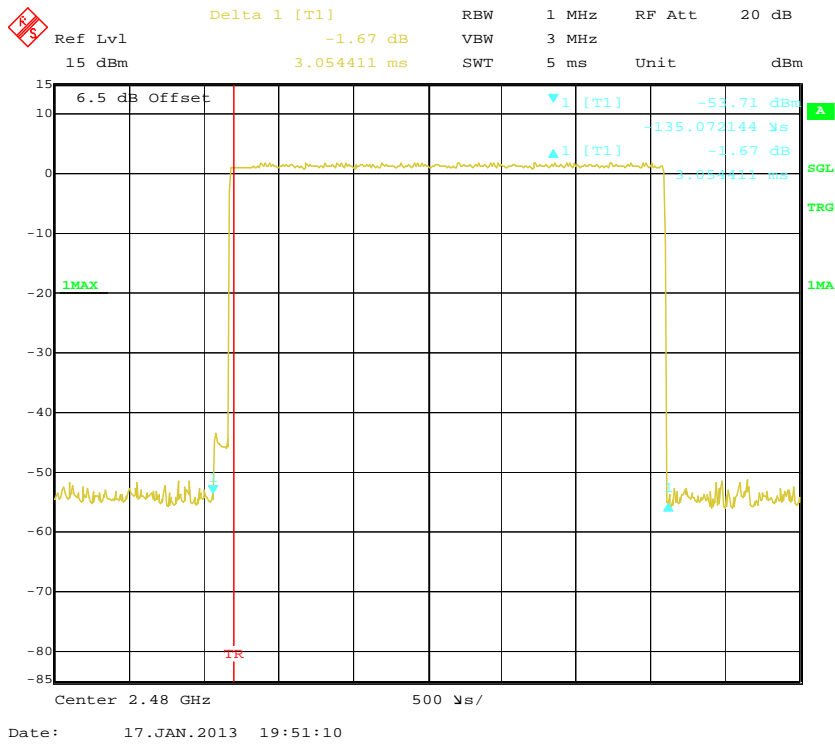
Date: 17.JAN.2013 19:52:10

**Pulse time, Middle Channel, DH5**



Date: 17.JAN.2013 19:51:45

### Pulse time, High Channel, DH5



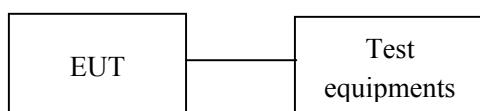
## FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

### Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

### Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI test receiver.
3. Add a correction factor to the display.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100 kPa

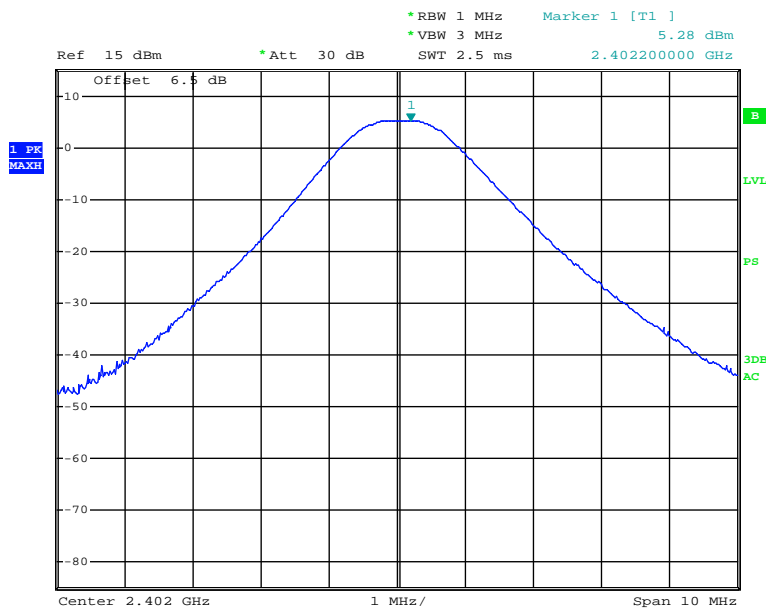
*The testing was performed by Dick Zhang on 2013-01-18.*

*Test Mode: Transmitting*

*Test Result: Compliance. Please refer to following tables and plots*

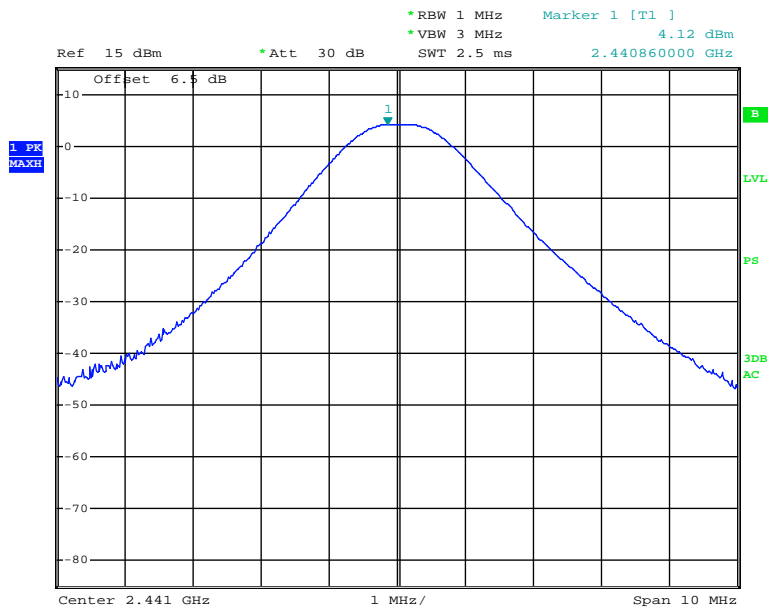
Mode	Channel	Frequency (MHz)	Conducted Output Power		Limit (mW)
			(dBm)	(mW)	
BDR (GFSK)	Low	2402	5.28	3.37	1000
	Middle	2441	4.12	2.58	1000
	High	2480	3.00	2.00	1000
EDR ( $\pi/4$ -DQPSK)	Low	2402	4.07	2.55	1000
	Middle	2441	2.95	1.97	1000
	High	2480	1.99	1.58	1000
EDR (8DPSK)	Low	2402	4.35	2.72	1000
	Middle	2441	3.34	2.16	1000
	High	2480	2.42	1.75	1000

**BDR (GFSK): Low Channel**



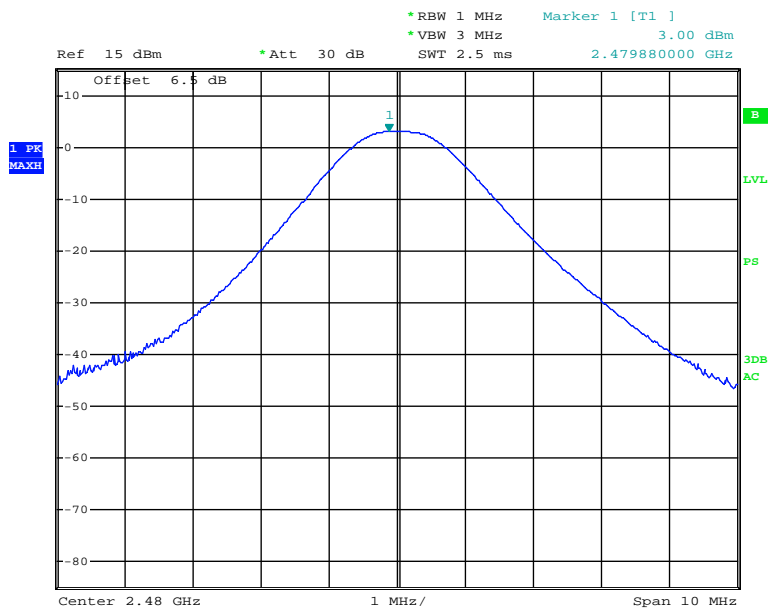
Date: 18.JAN.2013 19:25:12

### BDR (GFSK): Middle Channel



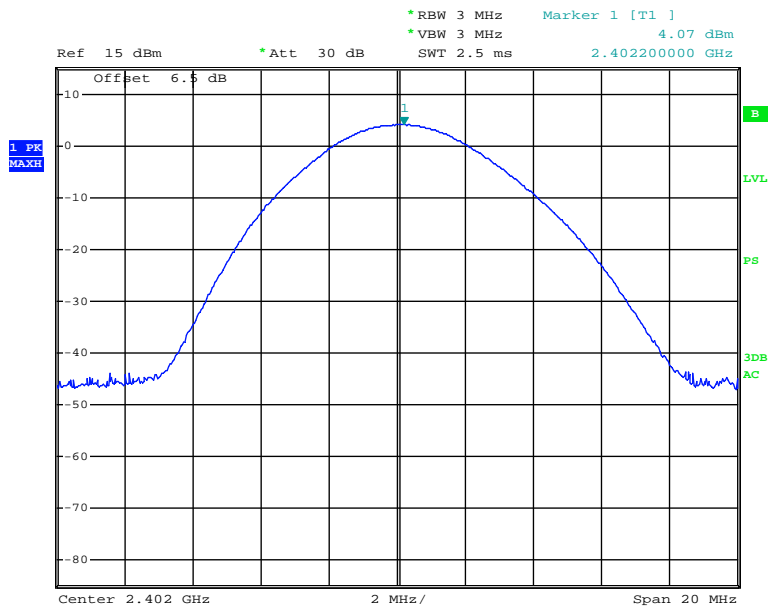
Date: 18.JAN.2013 19:24:49

### BDR (GFSK): High Channel



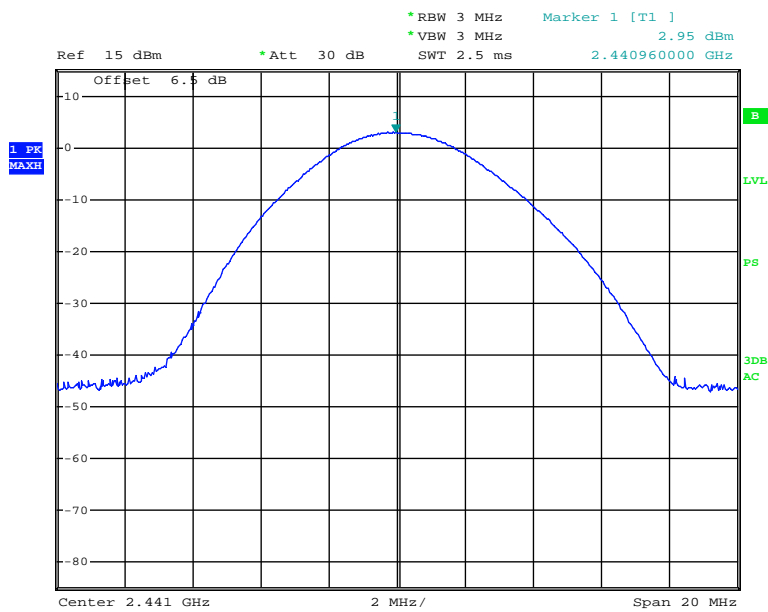
Date: 18.JAN.2013 19:24:12

### EDR( $\pi/4$ -DQPSK): Low Channel



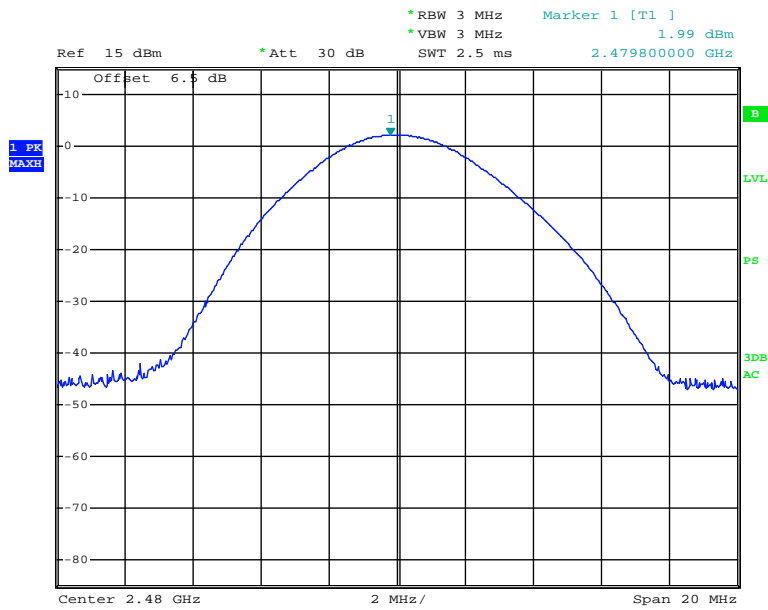
Date: 18.JAN.2013 19:19:59

### EDR( $\pi/4$ -DQPSK): Middle Channel



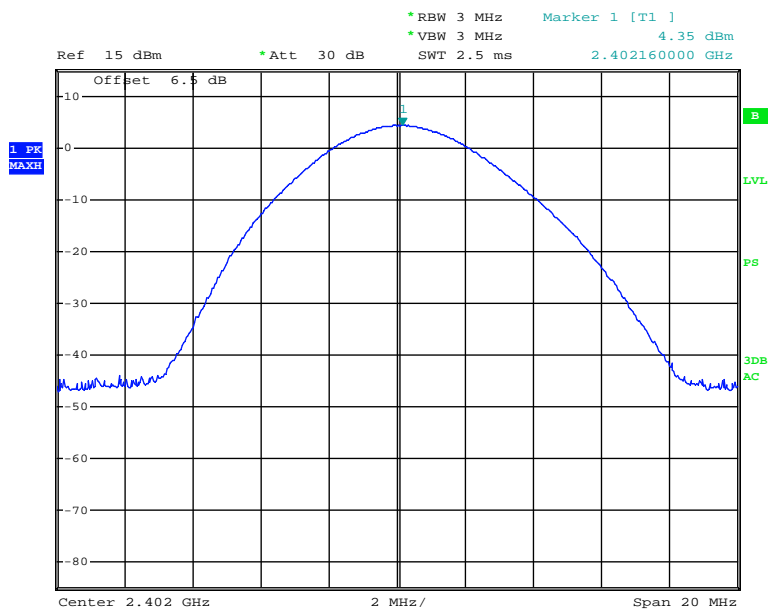
Date: 18.JAN.2013 19:20:29

### EDR( $\pi/4$ -DQPSK): High Chanel



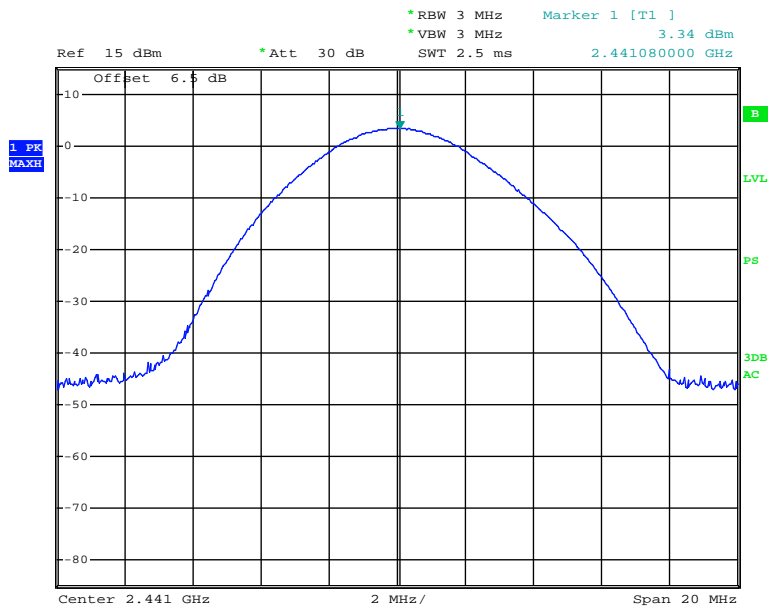
Date: 18.JAN.2013 19:21:11

### EDR(8DPSK): Low Channel



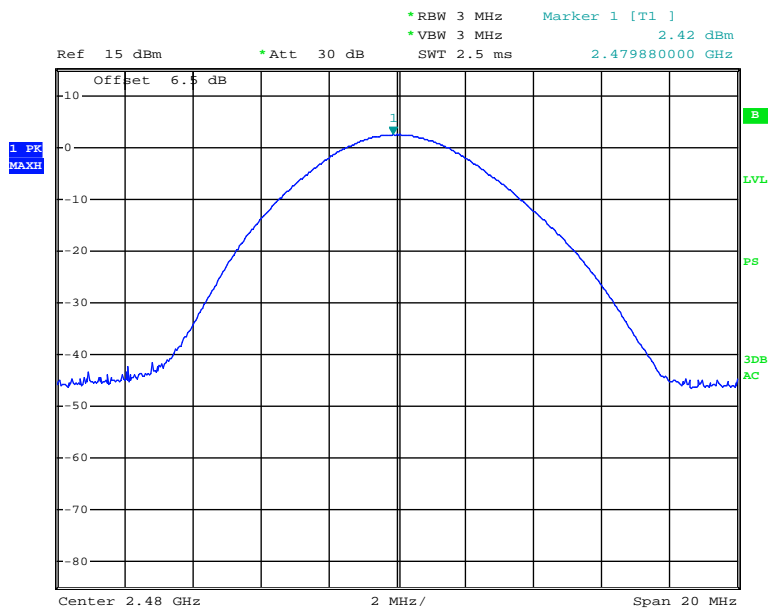
Date: 18.JAN.2013 19:19:23

### EDR(8DPSK): Middle Channel



Date: 18.JAN.2013 19:19:00

### EDR(8DPSK): High Chanel



Date: 18.JAN.2013 19:18:18



## **FCC §15.247(d) - BAND EDGES TESTING**

### **Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### **Test Procedure**

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25°C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100 kPa

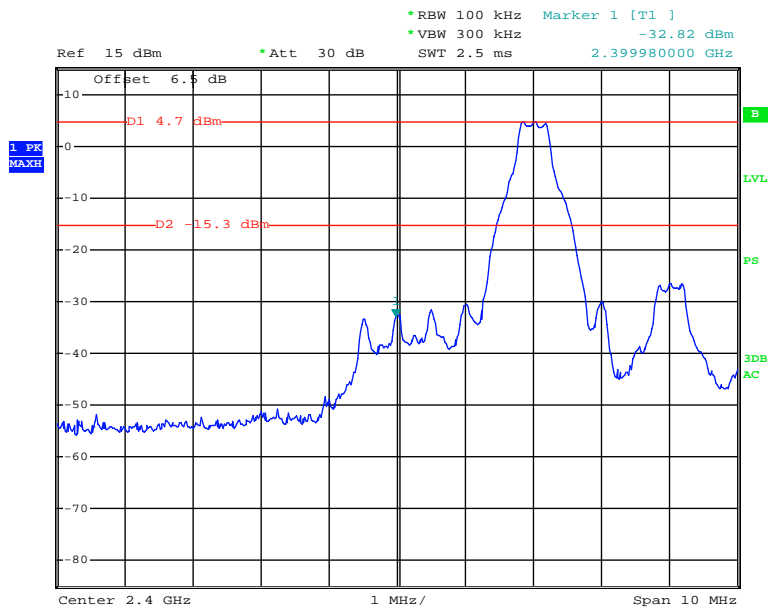
The testing was performed by Dick Zhang on 2013-01-18.

Test Mode: Transmitting

Test Result: Compliance. Please refer to following table and plots

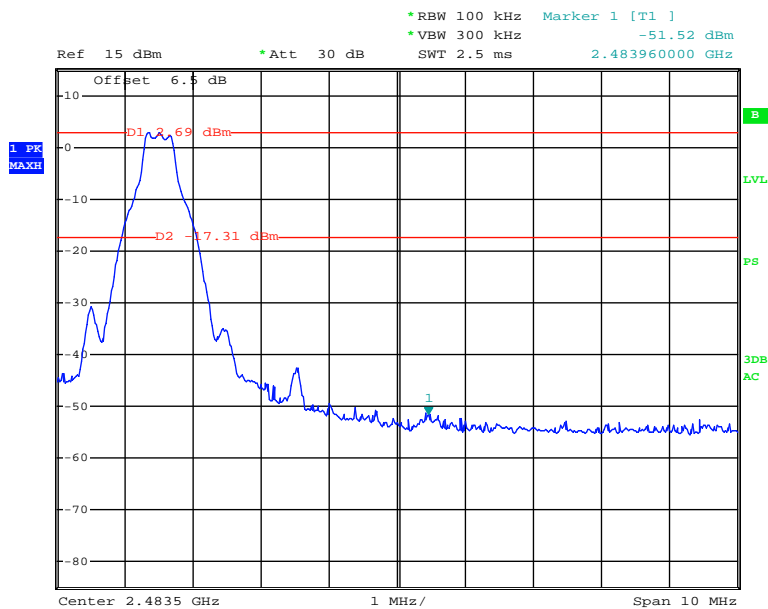
Mode	Band edges	Delta Peak to Band Emission (dBc)	Limit (dBc)
BDR (GFSK)	L	37.52	> 20
	R	54.21	> 20
EDR ( $\pi/4$ -DQPSK)	L	42.43	> 20
	R	51.46	> 20
EDR (8DPSK)	L	41.54	> 20
	R	53.21	> 20

### BDR (GFSK): Band Edge-Left Side



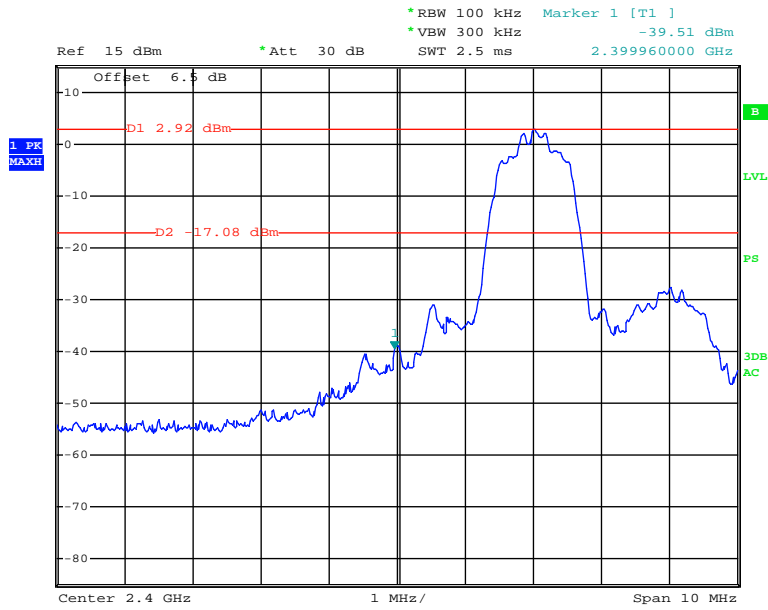
Date: 18.JAN.2013 19:09:27

### BDR (GFSK): Band Edge-Right Side



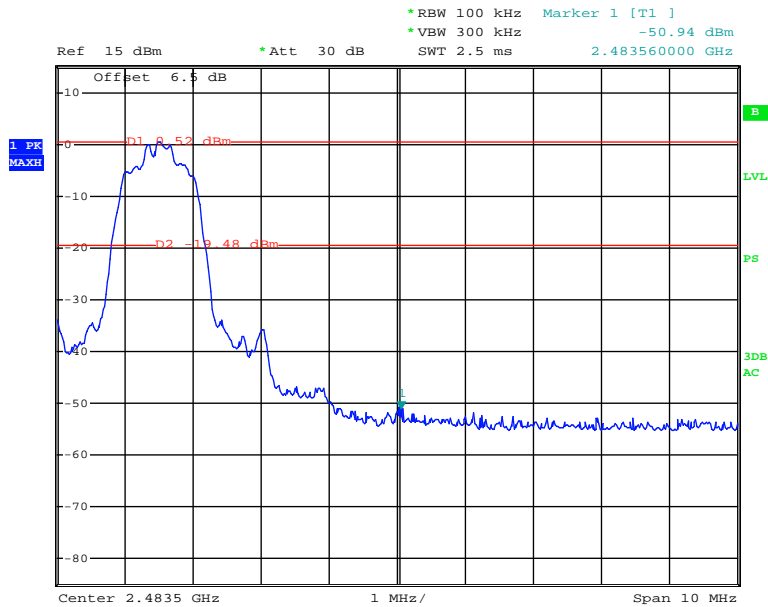
Date: 18.JAN.2013 19:11:35

### EDR ( $\pi/4$ -DQPSK): Band Edge-Left Side



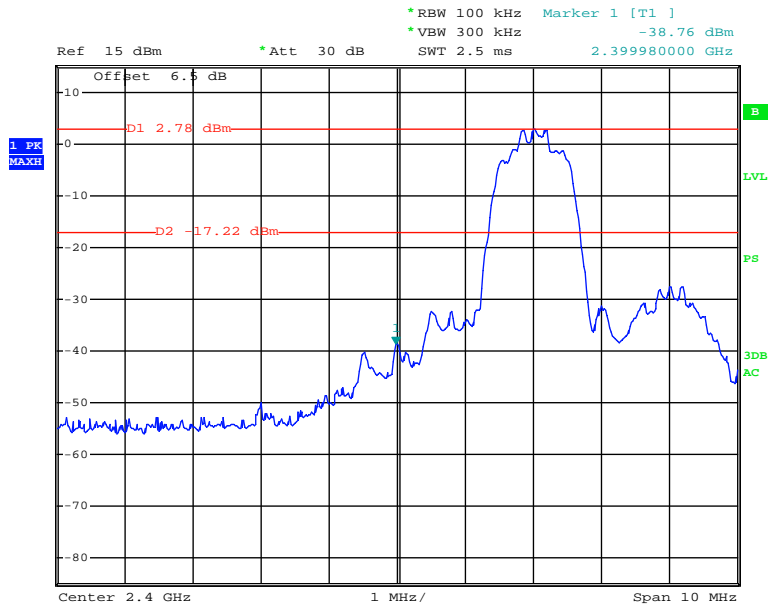
Date: 18.JAN.2013 19:14:22

### EDR ( $\pi/4$ -DQPSK): Band Edge-Right Side



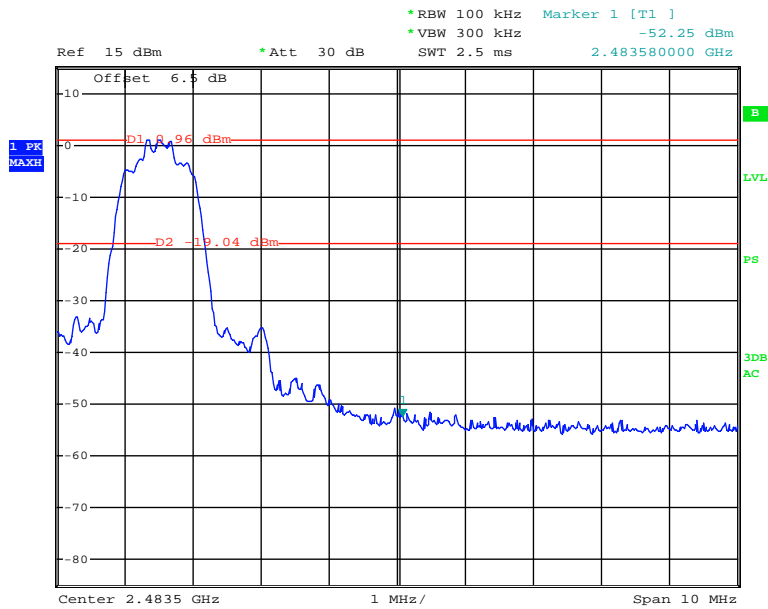
Date: 18.JAN.2013 19:13:06

### EDR (8DPSK): Band Edge-Left Side



Date: 18.JAN.2013 19:15:32

### EDR (8DPSK): Band Edge-Right Side



Date: 18.JAN.2013 19:16:56

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## PRODUCT SIMILARITY DECLARATION LETTER

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**DEPO Manufacturing Corp., Ltd.**

1206, BLOCK A Electronic Science & Technology Building, 2070 Shennan Zhonglu,  
Shenzhen, P.R. China

Tel: 0755-83781163

Fax: 0755-83780483

Date: 2013-01-16

### Declaration of Similarity

To:

Bay Area Compliance Laboratories Corp. (Shenzhen)  
6/F, the 3rd Phase of Wan Li Industrial Bldg., Shihua Rd.,  
FuTian Free Trade Zone, Shenzhen, China  
Phone: +86 755 33320018, Fax: +86 755 33320008  
<http://www.baclcorp.com.cn>

We, **DEPO Manufacturing Corp., Ltd.** hereby declare that our product "Bluetooth mini speaker", model EBS1002 and EBS1001 are electrically and mechanically identical, share the same PCB Layout and components. And differences between them are the model number according to different clients' requirements. And model EBS1002 was tested by BACL.

Sincerely,

Signature: Maggie He

Title: Manager Assistant

A handwritten signature in black ink that reads "Maggie He". The signature is written in a cursive, flowing style.

\*\*\*\*\* END OF REPORT \*\*\*\*\*